



Online Peer Support Groups to Combat Digital Addiction: Acceptance Factors, Design Features and Guidelines

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A thesis submitted in partial fulfilment of the requirements of Bournemouth University for the degree of Doctor of Philosophy

**Dec 2021
Bournemouth University**

ABSTRACT

Technology has introduced positive changes to human lives, made them more easily connected, and worked faster and more comfortably. However, technology also comes with hidden costs as its impact on wellbeing has become an area of concern. Certain relationships with technology exhibit symptoms of behavioural addiction. Online gaming disorder is an example of a problematic relationship with technology, which is obsessive and associated with damage to the players and their social circle. Social media has also been shown to trigger issues related to the wellbeing of users, such as jealousy, fear of missing out and lowering self-esteem. In some cases, people may need help to manage that relationship.

A peer support group is a mechanism to get both informational and moral support from people who have a similar issue and are willing to change. It has also been shown to increase commitment to plans and prevent relapse in addictive behaviour. At the same time, such groups need management to maintain their usefulness and avoid risks. Examples of risks include promoting negative behaviour, trivialising problematic behaviour, lowering the confidence of some members and digression.

Advances in social networking made it possible to host peer support groups online. It is also argued that hosting group sessions online is beneficial as members can be more open about their issues. At the same time, it can introduce additional risks such as a lack of adherence to group norms and regulations when people participate anonymously. Current online peer support groups are built using the de-facto social networking facilities, making it difficult to tailor them to the particular needs of this behaviour change technique, especially in setting privacy requirements about behaviour monitoring and providing motivational feedback such as self-monitoring social support and rewards. In other words, there is a need for a bespoke set of design elements, techniques and guidelines to building online peer support platforms.

In this thesis, a series of qualitative studies and a survey were conducted to explore the acceptance and rejection factors of online peer support groups platforms by people who wish to change their problematic internet behaviour. The thesis takes digital addiction as an exemplar throughout the thesis. Such a problematic behaviour also has the benefits of being online and enabling self-monitoring based on objective data, i.e. the usage data that can be captured automatically, such as time spent on devices and applications used and the usage timestamps. The thesis explored the space of variability in online peer group platforms' design and the inter-relationships between the design features. Also, performed inferential analysis to study the relationship between demographics, personality traits, self-control, and attitude towards online peer groups on the one hand and acceptance and rejection factors and design features on the other. We utilised our findings and built a process to aid in designing online peer support groups platforms and their

configuration. An initial evaluation of the process was performed. Participants found the process and its material useful in general. An optimisation of the steps and material and, also, more research on the topic are still needed to make it more efficient and capable of making more recommendations to designers and groups.

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ACKNOWLEDGEMENT

I would like to thank my supervisor Raian Ali for his advice, encouragement, patience and understanding throughout my PhD journey. Raian always cared about my research and motivated me to improve my academic skills. Without him, it would have been impossible to finish this research. He always stood up when I needed his support.

I would also like to thank my second supervisor John McAlaney for his guidance, support and valuable feedback, especially with his psychology insights and advice on the statistical analysis. I am also thankful to my third supervisor, Keith Phalp, for his guidance and feedback. I am grateful to my parents and my lovely two kids, Layan and Mohammed. My kids have been a constant source of strength and inspiration, and without them, this thesis would have never been written.

I would like to thank my friend Sainabou Cham from Bournemouth University for her support and help. She has always supported and encouraged me during my PhD journey.

Finally, I am very grateful to Naomi Bailey, our fantastic Research Administrator, for helping and supporting me, especially during the stressful time while attempting to finish my PhD despite the difficulties COVID-19 introduced.

1. CHAPTER 1: INTRODUCTION

Internet use has risen significantly in recent years, leading to negative consequences on societies. Existing research indicates that individuals who have overuse internet face difficulty self-regulating and managing their time online. Digital addiction (DA) is problematic internet behaviour and can lead to compulsive or impulsive use and have negative consequences in terms of depression, a lack of sleep and reduced participation in real-life societies (Hampton et al., 2011). According to recent study, users who have digital addiction exhibit the same symptoms as those addicted to drugs, tobacco, or alcohol. Salience, conflict, and mood modification are just a few examples of the symptoms (Griffiths, 2005). An increasing number of studies are being conducted on the use of technology to combat problematic behaviour and improve well-being, such as mobile applications for quitting smoking, enhancing mental health, fitness, diet, and physical activities (McKay et al., 2019). The term "digital addiction" is used in this thesis to describe excessive use of the Internet as well as addictive internet behaviour. There is an ongoing debate whether to use the terms smartphone application addiction or addictions to specific online activities, such as online gambling, online gaming, cybersex addiction, or smartphone addiction to describe whether people are addicted to the Internet itself or to internet activities. (Starcevic, 2013, Davis, 2001, Griffiths et al., 2016, Pontes et al., 2015) performed a meta-analysis to examine the correlation between Internet addiction and depression.

The term Digital addiction is not yet formally used and internet addiction is yet not widely recognised as mental disorder. Hence, in this research, the online problematic behaviour is used interchangeably with digital addiction and I clarified this in this revised version of the thesis. The following text has been added to the introduction section in Chapter 1.

Digital addiction denotes a problematic usage of the internet, digital media, and smartphones which is associated with the harm caused by the phenomenon and its effects on the user's behaviour, such as depression, anxiety, lack of sleep, and reduced social activities. Although there is no unified definition for DA, it combines various sub-types such as internet addiction, gaming addiction, and cyber-relationship addiction (Young and de Abreu 2011a). The literature shows there are four definitions for DA. Each definition uses a different label to denote the condition (e.g. problematic internet use and internet addiction).

- Definition one: "***Problematic Internet Use is a multidimensional syndrome consisting of cognitive and behavioural symptoms that result in negative social, academic, or professional consequences***" (Caplan, 2005).

- Definition two: "**Internet Addiction** is the inability of individuals to control their Internet use, resulting in marked distress and/or functional impairment in daily life" (Ha et al., 2006),
- Definition three: "**Generalised Pathological Internet Use** is conceptualised as a multidimensional overuse of the Internet itself that results in negative personal and professional consequences" (Davies, 2001).
- Definition four: "**Technological addiction** is operationally defined as non-chemical (behavioural) addictions that involve human-machine interaction" (Griffiths, 2000).

A sizeable proportion of users spend excessive time online, which may lead to adverse effects on their work or personal lives. Moreover, addictive and problematic technology use is growing worldwide (Ofcom, 2018). The currently available solutions (Young, 1998) are based on heavy intervention such as motivational interviews (Rubak et al., 2005) and cognitive behavioural therapy (CBT) (Kouimtsidis et al., 2007). However, these solutions do not scale due to many people starting to have a problem (Ofcom, 2018). With the World Health Organization recognising gaming disorder in June 2018, health programmes nationally and internationally have started to reserve a proportion of their budgets for its treatment. This thesis contributes by providing less expensive and more scalable online solutions to the problem, requiring only expert facilitators and relatively light moderation.

Several empirical reports have been published in digital addiction and compulsive use, for example, Fumero et al. (2018) performed a meta-analysis to study the correlation among Internet addiction and personal with social-psychological factors. The study covered 28 health and psychological literature databases from 2002 to 2017. The results showed that the risk factors had a more significant effect than protective factors on internet addiction. Personal factors had a greater connection on internet addiction than social factors. Chóliz (2016) studied the effect of the internet and mobile devices on access to online gambling. The result showed that online gambling significantly increases among young people. (Zhang et al., 2018) conducted a mean analysis to estimate the spread of internet addiction among 3651 medical students in different countries. The study found that the internet spread is approximately five times than that of the general population, i.e. 30.1%. According to the European Gaming and Betting Association (Association, 2019), the online gambling market in European countries grows about 10% per year. Online gambling revenue has increased from €20 billion in 2017 to €22 billion in 2018 17.5% and is projected to rise from €22.2 billion in 2018 to €29.3 billion in 2022.

Additionally, Ofcom Communications (Ofcom, 2018), the UK communications regulator, focuses on how people in the UK are dependent on their smartphone devices and need a constant connection to the internet. In the UK Nine in ten people are concerned about using the internet,

and online harm, around a third of adults (34%) feel cut off without internet access, and 29% feel lost if they cannot go online. Moreover, 17% of adults say they find it stressful if they cannot access the internet and half of the adults (50%) say feel their life would be boring if they could not go online. Moreover, it is mentioned that in the UK (62%) of internet users spent a long time on the internet using smartphone devices. Also, people check their smartphone on average every 12 minutes of the working day. In the UK, 2 in 5 adults (40%) check their mobile phones within five minutes of waking up, increasing to 65% of adults below 35. Similarly, 37% of adults first look at their phone five minutes before putting lights out, climbing to 60% of those below 35 (Ofcom, 2018).

The research on digital addiction is still limited and existing research view digital addiction as a problem from the user side than that of the system or user interaction design. The treatments available for digital addiction is minimal because this type of addiction (apart from online games) is not yet categorised as a mental disorder in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM). Consequently, there is a need for treatment to prevent harm and reduce the online activities that enable people to have self-control on their online use. Many studies have been performed to examine the effectiveness of such treatments for harm reduction and moderate online activities, which are psychological and pharmacological approaches used to manage digital addiction (Peukert et al., 2010). There is a growing demand for developing and examining various psychological treatments for digital addiction. However, there is a paucity of empirical studies that have examined the effectiveness of psychological interventions to reduce the time spent online (Winkler et al., 2013, Huang et al., 2010).

Moreover, there is inconsistency in the psychological and pharmacological approaches literature. (King and Delfabbro, 2014) studied intervention methods to internet gaming disorders and discovered no evidence supporting long-term treatment. In Zajac et al. (2017), 26 studies of treatment to both internet addiction and internet gaming disorder were systematically reviewed; they found a paucity of well-designed treatments and limited effectiveness of the treatments.

The existing research on digital addiction has focused on users' psychology, the attractive features of the internet and the role of software design, such as (Griffiths, 2000, Hammersley, 1995). The existing practices and interventions to digital addiction are restricted to access constraint rules and policies. For example, rehabilitation services and Cognitive Behavioural Therapy (CBT) methods (Young and De Abreu, 2011). Also, informative programmes aim to educate parents, teachers, and people in the community about the risk of overusing the internet and how to set limitations (Vondráčková and Gabrhelik, 2016). Furthermore, there is a lack of studies that place software developers as the main players in digital addiction progress. Two significant exceptions are (Alrobai et al., 2014, Ali et al., 2015). Hence, software characteristics and how they interact may impact human activity and must be studied (Alrobai, 2018).

Another encouraging and promising method is to apply cooperative support in peer groups. Peer group has been acknowledged as an important therapy method in the treatment of addictive disorders and addiction recovery support services (Bassuk et al., 2016). Peer support in mental health condition is defined as “social emotional support, frequently coupled with instrumental support, that is mutually offered or provided by persons having a mental health condition to others sharing a similar mental health condition to bring about a desired social or personal change” (Solomon, 2004). In addictive behaviour, peer support is referred to as when people gather with others who have the same problem and experience to participate in activities that include mutual support and social emotional support to enhance psycho-social well-being and reintegrate them back into society (Sarrami-Foroushani et al., 2014).

This thesis recommends applying such interactive systems such as persuasive technology and gamification to mediate peers’ support groups. The thesis proposes the importance of users acceptance to interactive systems, which is considered preliminary to online peer groups’ success. The online peer support group system aims to put individuals together who share similar interest, which is combating digital addiction together. The group also has counsellors to eliminate any adverse side effects or deviant behaviours in group interaction, for example, social loafing and reward (Simms and Nichols, 2014). Nevertheless, it is still unclear how to design and transform from a face-to-face support group to virtual environments to positively support and direct behaviour change. This is because of the distinctive characteristics of online social structures and designs. Also, some people self-disclose themselves online more than in person due, e.g. dissociative anonymity, invisibility, a synchronicity, solipsistic and minimization of authority (Suler, 2005).

Also, despite the fast advancement in technology and the comprehension of the psychological procedures that would enhance behaviour change, it is still required to turn the focus in the direction of the group mechanism and dynamics in the evaluation and scrutiny of the approach. This is due to the availability of many software-based facilitated activities designed to provide peer support in a variety of settings. However, the design of a peer support group should not just focus on collective group requirements but should consider different individual needs, requirements, and performances. This thesis would consider and discuss the variability of the individual preferences for the design and configuration of online peer support groups.

Human behaviour cannot be fully predicted and changing it is a hard process with no guaranteed outcome. Behaviour change theories aim to predict and facilitate behavioural change by trying to link the desire to change behaviour with the act of doing so, i.e. to bridge the gap between the intention and the action. These theories have been used in the field of addiction and mental health in general and could offer valuable insights into how to promote changes in digital addictive behaviour. Chapter 2 describes the behaviour change theories in greater details. For

example, peer groups are one of the methods used to combat addictive behaviour by changing that behaviour through peer influence, commitment and consistency and feedback. Peer groups denote a setting when a group of individuals with common interests come together to support and influence each other's behaviour, such as using social pressure to challenge negative habits through surveillance (Alrobai et al., 2016b). The work in (Alrobai et al., 2018) was one of the first to study the use of online social networking to explore how to host peer group method online. The focus of that work was on the operation and the running the group, including the roles that must be filled and the measures that must be taken to avoid relapse. Alrobai (2018) work views peer group as mechanism to strengthen treatment and prevent the possibility of relapse over time. In that work, the author only considered the operational phase of a peer support group and did not address the earlier stage of the lifecycle of peer groups, namely, peer's acceptance of the group setting, e.g. the communication protocols, and also the steps to achieve a consensus about them. Overall, there is a need for establishing a deeper understanding of acceptance and rejection factors of such software-assisted method by people with problematic behavior in general and problematic online usage and behaviour in particular, including DA. This understanding will inform the strategies used to introduce such software, as well as its configuration and governance processes. Therefore, this thesis complements the work in Alrobai (2018) and address the gap in their work by proposing a method that address an earlier stage of peer groups' life cycle. By doing so, this thesis maximises the possibility of per retention and participation in the therapeutic process.

Advance technology is utilised to design and engineer online peer groups, which can be an encouraging way of intervening with addicts. The existing literature shows a lack of structure approaches to design online peer support groups. The thesis argues that such acceptance is preliminary to online peer groups' success. The explanation for this is that members of the group freely report their online behaviours, feelings, and intentions. While technology can be designed to track this, people can still find ways to get around it if they want to, such as by using various devices and accounts or pretending that the usage was needed for work. Thus, having coercive approaches can trigger different denial patterns and delaying tactics. Hence, the thesis argues that it is necessary to adopt a persuasive approach not only about the product and rewarding positive change but also the process of building the product, i.e. by eliciting members' preferences and trying to accommodate them. People are more likely to be persuaded to accept a solution in which they have participated. This is the main principle of various design methodologies such as Participatory Design (Muller, 2007), user-centred design (Monk, 2000) and value-sensitive design.

Software configuration research has mainly focused on the composition of software components implementing features which are visible characteristics of the product from the user point of view. Software Product Lines is an example of a paradigm where software products are built by

composing and reusing components based on a selection of their stakeholders (Lindohf et al., 2021). These products are technical. For example, when buying an online booking system, a hotel management could choose to have the guest review feature or skip it. Similarly, the hotel may prefer to have a Chatbot to answer clients queries to all guests but have the hot line feature only to VIP customers. Such a feature selection is based on business needs and user preferences. However, in the case of online peer support groups that are meant to help people with certain behavioural problems, the selection process is different for two main reasons. First, as it is a social platform, the members need to be in agreement on how to interact and what interaction features to be present, e.g. monitoring and sharing performance, whom and how to allocate moderators. Second, some combinations of features can be possible technically but harmful to their behaviour and wellbeing. For example, having a reward system based on points and a monitoring system that captures smartphone usages are technically implementable and compatible with each other. However, this may not be useful and neither recommended for groups which require high privacy and possess serious behavioural issues. Gamification features, such as points and rewards, may appeal to people with low to moderate behaviour change needs. These all means that the configuration process of the peer support groups platforms has to be human centred.

The aim of this thesis is to aid the configuration of online peer support groups by applying suitable consensus building model. The thesis would help developers of social networks applications, such as Facebook, who would like to build or provide an online peer support group facility to users seeking to regulate their problematic usage. In addition, the thesis would help counsellors or moderators of existing online peer groups to customise an online peer support group platform and tailor it to include the suitable features and functionalities for the members. So, the counsellor or moderator can configure the online platform to meet the need of the group members and help the counsellor select which functionalities they shall add, remove or deactivate from the online peer support group. To be human-centric, which is at the core of the peer support group itself, The configuration process should be based on the participatory design approach . This means that the individuals who are having a problematic behaviour should be able, with the help of a moderator, to configure the online peer support group platform to meet their behaviour change needs and preferences by selecting features that they would like to see in the platform. This assumes that acceptance of the platform configuration is a necessary condition for the success of the behaviour change process.

1.1 RESEARCH AIM

This thesis explores the factors affecting people's acceptance and rejection of online support groups for combating and controlling digital addiction. This shall inform designers, moderators and groups themselves in discussing and agreeing a governance and social interaction style to follow within the groups and, also, what functionalities to include to facilitate it. Moreover, the

thesis aims to explore the individual preferences of designing and configuring the features of online peer groups in practice. By doing so, the thesis shall also help social network developers to explore the range of features to make available and their possible compatibilities and conflicts from a domain-specific perspective, i.e. what is like to help or hurt the behaviour change process. The thesis shall also help the counsellors of existing online peer support groups to configure their platforms based on the users preferences, stage of the problem and available resources, e.g. expert moderator or a peer member to replace counsellor.

1.2 RESEARCH QUESTION

Peer groups can follow different management and interaction strategies, e.g. the liberal style vs the highly hierarchal and directing style. Each of these strategies can have a different impact on peer groups' acceptance and efficiency. Group acceptance can be considered the first step towards efficiency. This thesis focuses on the acceptance of online peer groups to combat digital addiction. While doing this, the thesis strives to identify and warn against patterns known to cause problems and adverse effects such as promoting competition and negative group ethics. This is because group members can agree on patterns management and rewarding systems that impede the recovery process and lead to negative effects such as lowering self-esteem and creating the illusion of a speedy recovery.

Eliciting online peer group features that accommodate the diversity in preferences and counselling needs and configuring a particular platform to host a group in a way that is acceptable to group members is the focus of this thesis. Therefore, the main research question is about a systematic way to enable an informed elicitation of online peer groups' features and configuration that is also agreeable amongst the members and facilitators. The thesis also benefits from the empirical literature and the primary research conducted in this thesis to determine the various factors impacting the need for each feature to implement and the conflicts and dependencies between them. To address the main research question, the following sub-questions will be addressed in the thesis. Table 1 shows the link between the thesis questions, objectives, and chapters; therefore, the research questions are as follows:

Q1: What are the factors that affect user's acceptance and rejection of online peer group for people with problematic online behaviour?

Q2: What are the various preferences for the configuration and design of the online peer group for people with problematic online behaviour?

Q3: What are an effect of gender, culture, personality; and self-control on the acceptance factors, rejections factors and various design facets of online peer group platform?

Q4: How to use the knowledge obtained in Q1, Q2 and Q3 to inform design and configuration process of online peer group and its agreement amongst the group members and facilitators.

1.3 RESEARCH OBJECTIVES

This section provides the research objectives and presents an overview of how to answer the research questions and achieve the research objectives.

Objective 1: Literature review

The researcher will review the literature around digital addiction from psychology which includes behaviour change theories, to help the researcher obtain a deep understanding of addiction psychology for changing behaviour. Also, to build knowledge about the technology that has been used to deliver behaviour change interventions and facilitate a better understanding of the research problem and build knowledge about topics related to the research issues. Also, exploring and reviewing the literature related to the research topic will help determine what is already known about the topic. This research will review peer support groups in traditional counselling, with focus on addictive behaviours, to get a deeper understanding of it. The literature would help this research to provide a foundation for the thesis solution.

Objective 2. Exploring the acceptance and rejection factors of online peer groups.

There is a limitation in the behaviour addiction literature to identify the acceptance and rejections factors in designing an online platform for behaviour change. This objective aims to explore the factors that affect a personal decision for acceptance and rejections of online peer groups for controlling or changing online behaviour. To achieve this objective, a qualitative method is used to explore the acceptance and rejection factors to join and participate in such online groups. Also, quantitative method is applied to study the effect of culture, personality, self-control, gender on the willingness to join the groups and perception of their usefulness on such acceptance and rejection factors. This objective employs the Technology Acceptance Model (TAM) as a baseline model to explore user perception of the techniques in terms of ease of use and usefulness, the subjective norms around the problem and the techniques and their conditions on the design and the group management.

Objective 3. Exploring the design variability facets of online peer groups platforms.

The literature showed limitations in the design of software-assisted behaviour change that meet user's and counselling preferences using the available platforms, such as forums and mobile applications communication groups. This objective delves into the detail of online peer group platforms' design and explores these design variabilities spaces to accommodate different users' preferences. For example, members can differ in terms of preferences towards the reward system and how the performance is measured. While some prefer long-term measurement, others prefer

more detailed short-term monitoring and rewards. Preferences could also relate to the permission given to the facilitator and their role. To achieve this objective, a qualitative method was used to explore the variability configuration of online peer group platforms and explore the different users' preferences. A quantitative method is used to study the effect of culture, personality, self-control, gender, willingness to join the groups, and the perception of their usefulness to the user preference explored from the qualitative approach.

Objective 4. Proposing materials for agreeable peer group configuration.

This objective sought to apply suitable consensus building model that could be employed for agreeable peer group configuration. By pursuing Objectives 1 and 2, a body of knowledge about the diversity and potential discrepancy towards online peer group configuration is amassed. In this objective, materials, steps and consensus building materials are proposed for the group members and facilitators to follow and agree on a design variation that accommodates, as far as possible, the different preferences of all stakeholders. The materials also include recommendation and guideline to help the users select the right features and enhance negotiation process. This Such a consensus building provides a sense of being valued and considered in the decision-making process and potentially contribute to accepting the outcome.

Objective 5. Evaluating the method.

Three focus groups sessions are conducted. The evaluation study involves participants who have problematic online behaviour. The first session is to get agreements between the participants on the online peer group design configuration without help. The second session provides the proposed materials to the participants but without the recommendation and guidelines. It aims to assess the extent the proposed materials would help to improve user's agreement about the design configuration of the online peer group platform. The third session provides the proposed materials with the recommendation and guidelines to the participants. It aims to improve user negotiation and agreement about design configuration of the online peer group. The researcher will observe the first, second and third sessions, and decide the usefulness of the proposed materials based on the negotiation and argumentation processes conducted to decide and agree about configuring features of the online peer group.

TABLE 1: MAPPING RESEARCH QUESTIONS, OBJECTIVES AND THESIS CHAPTERS

Research Question	Research Objectives	Chapters
Q1: What are the factors that affect users' acceptance and rejection of online peer group for people with problematic online behaviour?	Objective 2	Chapter 4

Q2: What are the various preferences for the configuration and design of the online peer group for people with problematic online behaviour?	Objective 3	Chapter 5
Q3: What is the effect of gender, culture, personality trait self-control on acceptance factors, rejection factors and variability design facets of online peer groups platform?	Objective 1 Objective 4	Chapter 6 Chapter 7
Q4: How to use the previous findings and inform the design and configuration of online peer groups?	Objective 4 Objective 5	Chapter 8

1.4 BRIEF DESCRIPTION OF THE METHODOLOGY

The research will initially follow a qualitative design. To achieve Objectives 2 and 3, a series of focus groups and interviews will be conducted. To make the discussions rich and real, mock designs of peer groups and usage scenarios will be presented. Subsequently, the findings are confirmed and enhanced using a large-scale survey. This makes the chosen approach a mixed method. However, the methodology's main component is the qualitative aspect because the survey will only be used to confirm the importance of the aspects.

In contrast, the qualitative component explains in detail when and how to manage it. The empirical literature concerning negotiation and consensus building is used to inform the design of the studies required for Objective 4. The method will also utilise the principles of participatory design. During the sessions, observations and document analysis are used. The researcher observes the negotiation process during the sessions and asks them to note down their thoughts in a set of documents and templates that are subsequently content analysed.

1.5 CONTRIBUTION TO KNOWLEDGE

Online peer groups are a type of technology-assisted behaviour awareness software that is meant to provide peer support, counselling, motivational and learning environment, and ambivalence reduction through sharing and hope installation. Advances in social networking made it possible to host peer support groups online. It is also argued that hosting group sessions online is beneficial as members can be more open about their issues. At the same time, it can introduce additional

risks such as a lack of adherence to group norms and regulations when people participate anonymously. Current online peer support groups are built using the de-facto social networking facilities, making it difficult to tailor them to the particular needs of this behaviour change technique, especially in setting privacy requirements about behaviour monitoring and providing motivational feedback such as self-monitoring social support and rewards. In other words, there is a need for a bespoke set of design elements, techniques and guidelines to building online peer support platforms. To help address these issues, the thesis has two main contributions. The first contribution is the amassing of a body of knowledge detailing the factors that affect a person's decision to participate in online peer groups to combat digital addiction. These factors relate to peer groups' perceptions and their design elements and management. This is important to understand what would lead the decision of an individual to be part of the group, to continue in it and also to exit it. The second contribution includes the proposed templates and steps that help members and facilitators to agree on the online peer group configuration. Such a method accommodates the various preferences and helps members reconcile them and resolve conflicts. This assumes the functionalities needed for an online peer group are implemented, but the selection of the functionalities to include or activate is to be agreed.

1.6 BENEFICIARIES

Presently, there is an increase in research on the development of software-assisted behaviour change. For example, there is a wide range of apps available in the market that aim to help users to change their behaviour (Milne-Ives et al., 2020). Their acceptance is likely to vary, and this thesis will enhance our knowledge of the factors that may affect this genre of software taking online peer support groups as an exemplar. Such online groups can contain a wide range of functionalities including those who exist in software used in a non-group setting, e.g. goal setting, reminders, self-monitoring and feedback. Therefore, the findings of the thesis can also be beneficial to the wider research in software-assisted behaviour change.

The thesis contributes to the community of designing for mental health solutions in terms of the principles and factors that, when considered, the acceptance of software-assisted behaviour change in general and via online peer groups in particular, can be increased. It also provides health professionals with a systematic way to configure and set up online platforms to host peer groups which is relatively inexpensive solution to tackle problematic behaviours in general and digital addiction in particular.

Hence, the beneficiaries of the thesis include software developers of social network such as Facebook who want to add an online peer group platforms to their networks and want to know the variability spaces of their features to offer them and make it possible to configure later. It could be also the developers of plug-ins which can be integrated to these platforms, i.e. facilities developed by a third-party company. Also, health care providers will benefit on how to tailor

existing online peer group with the features and functionalities needed for their particular needs and members. Like any group, peer support groups can be formed by volunteers, e.g. those who had the problem in the past and would like to offer help. Volunteers who want to establish online peer groups and offer services online to people or group of people who have problematic behaviour in general and digital addiction in particular, are assisted with steps and templates to get the setting of the online platform in a way that is accepted by members and that minimises risks of adverse effects on the recovery process. Finally, the thesis would help researchers in both social network design and also behaviour change who can take this research as a starting point to study more in-depth the acceptance and rejection factors and design features and functionalities and their fitness to various psychometrics related to individuals. For example, it can be argued that a personality trait like agreeableness or a psychometric like susceptibility to peer pressure would play role in accepting a moderation style based on vote or expert opinion. Researchers can take the finding of this thesis and also study the argued compatibility and conflicts amongst the feature in practice and refine them further.

1.7 THESIS STRUCTURE

The outline of the thesis structure is presented in Figure 1. This thesis is structured as follows: Chapter 2 presents the literature review of multidisciplinary topics related to the main research topics. In Chapter 3, a description of the methodology and the methods that followed to achieve the research objectives are presented; Chapter 4 presents the exploration study performed to investigate the acceptance and rejection factors of online peer group and Chapter 5 presents the study conducted to explore the various design requirements to online peer group and the different users preferences to the design. Chapter 6 and Chapter 7 present the results of the online survey that was conducted in Chapter 6 to study the effect of culture, personality, self-control, gender, willingness to join the groups and perception of their usefulness on such acceptance and rejection factors, also in Chapter 7, the effect of culture, personality, self-control, gender, willingness to join the groups and users preference on the design of online peer group was studied. Chapter 8 presents the evaluation of the proposed materials. Finally, Chapter 8 provides a summary of the thesis, the future work and the limitations.

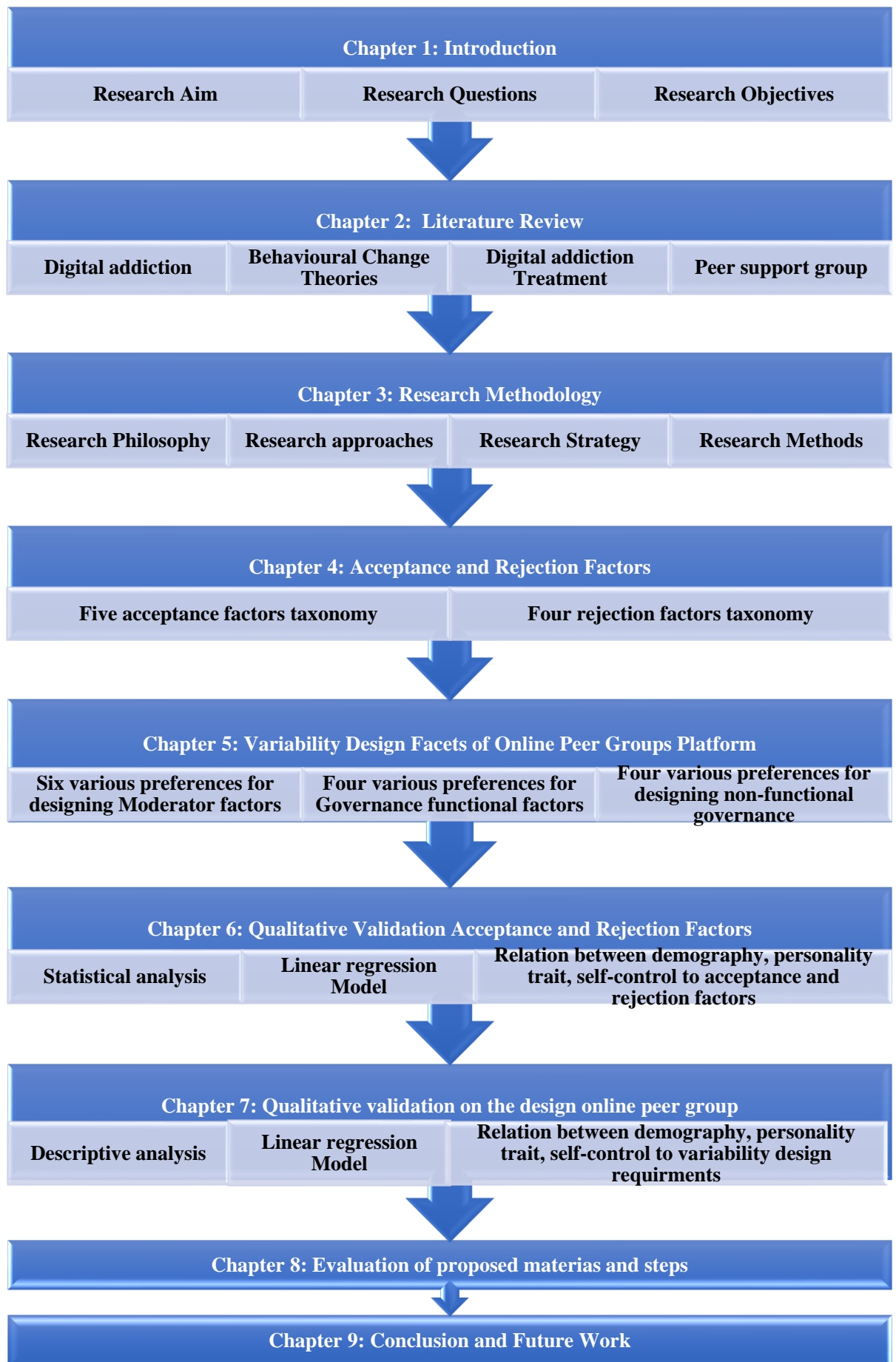


FIGURE 1: THESIS STRUCTURES

- Aldhayan M., Naiseh M., McAlaney J., Ali R. (2020) Online Peer Support Groups for Behavior Change: Moderation Requirements. In: Dalpiaz F., Zdravkovic J., Loucopoulos P. (eds) Research Challenges in Information Science. RCIS 2020. Lecture Notes in Business Information Processing, vol 385. Springer, Cham. https://doi.org/10.1007/978-3-030-50316-1_10
- Aldhayan M., Cham S., Kostoulas T., Almourad M.B., Ali R. (2019) Online Peer Support Groups to Combat Digital Addiction: User Acceptance and Rejection Factors. In: Rocha Á., Adeli H., Reis L., Costanzo S. (eds) New Knowledge in Information Systems and Technologies. WorldCIST'19 2019. Advances in Intelligent Systems and Computing, vol 932. Springer, Cham. https://doi.org/10.1007/978-3-030-16187-3_14

The author contributions, as a co-author, in related researches:

- McAlaney J., Aldhayan M., Almourad M.B., Cham S., Ali R. (2020) Predictors of Acceptance and Rejection of Online Peer Support Groups as a Digital Wellbeing Tool. In: Rocha Á., Adeli H., Reis L., Costanzo S., Orovic I., Moreira F. (eds) Trends and Innovations in Information Systems and Technologies. WorldCIST 2020. Advances in Intelligent Systems and Computing, vol 1161. Springer, Cham. https://doi.org/10.1007/978-3-030-45697-9_10
- McAlaney J., Aldhayan M., Almourad M.B., Cham S., Ali R. (2020) On the Need for Cultural Sensitivity in Digital Wellbeing Tools and Messages: A UK-China Comparison. In: Rocha Á., Adeli H., Reis L., Costanzo S., Orovic I., Moreira F. (eds) Trends and Innovations in Information Systems and Technologies. WorldCIST 2020. Advances in Intelligent Systems and Computing, vol 1160. Springer, Cham. https://doi.org/10.1007/978-3-030-45691-7_68
- Cham, S., Algashami, A., Aldhayan, M., McAlaney, J., Phalp, K., Basel Almourad, M., Ali, R. Digital Addiction: Negative Life Experiences and Potential for Technology-Assisted Solutions. WorldCIST'19 – 7th World Conference on Information Systems and Technologies. Springer AISC Series. 16-19 April 2019. La Toja Island, Spain. DOI: 10.1007/978-3-030-16184-2_87.

Digital addiction denotes a problematic usage of the internet, digital media, and smartphones which is associated with the harm effects on the user's behaviour, such as depression, anxiety, lack of sleep, and reduced social activities. The main difference between internet addiction and digital addiction is that the later does not require internet connectivity as people may be attached to gadgets and offline gaming as well as social robots and other emerging technology. Digital technologies could lead to compulsive or impulsive use and have negative consequences in terms

of depression, reduced involvement in real-life communities and a lack of sleep (Hampton et al. 2007).

Latest studies have shown that users who become overly attached to digital technologies exhibit similar symptoms similar to those found in smoking and alcohol addiction such as salience, conflict and mood modification. Digital Addiction (DA) is yet not formally recognized as a mental disorder by the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition: DSM-5 although the World Health Organization (WHO) recently recognized gaming disorder in their revision of the International Classification of Diseases (ICD-11) in June 2018. Despite being a vehicle for the issue, the nature of digital media can help also in hosting of methods to combat DA, e.g. in the monitoring of online usage and enabling individuals to stay in control of it. One of the techniques proposed in the literature is Online Peer Groups platforms to enable people to form groups and provide peer support to control and regulate their digital usage and other harmful experiences online, e.g. bullying and gambling. Game Quitters (<https://gamequitters.com/>) is an example of such popular platforms.

1.10 CHAPTER SUMMARY

This chapter introduced the problem and established the importance of the research being undertaken. This chapter provide the research question was contextualised, and a set of objectives was identified. Also, a brief introduction of the methodology to be followed was provided. The argument about the beneficiaries, both from the software engineering side and the health professional side, was also made. Furthermore, the contribution to knowledge was clarified to reflect the thesis's outcome.

2. CHAPTER 2 LITERATURE REVIEW

This chapter provides an overview of digital addiction and online peer groups as a motivational tool for behavioural change. Also, it discusses established behavioural change theories that laid the foundations for understanding human behaviour which could support the behavioural change process, then the related models and aspects of technology adoption as a guide for the design of self-regulatory tools. Finally, various design approaches and the technology acceptance models are presented.

This research explores the acceptance and rejection factors of an online peer group and the requirements and different preferences and perspectives with regards to the group moderation, functional and non-functional governance and the design features of the online peer group platforms. The thesis studies some of the effects related the individuals and their cultural characteristics on the acceptance and rejection of the mechanism and also the preferences over the design features. This is to assist with the engineering and design of the online peer group platforms. Also, by understanding users' opinions, online platforms that offer peer support groups may be better designed and could better conform to the Human-Centered Design (HCD) approach. For example, it aids in setting up features such as the monitoring system, membership procedure, and awards in a way which is agreeable amongst members and fit to their preferences. It may also aid governance procedures and the establishment of a common ground structure, such as moderator assignment and management style. The process is to support tailoring which pertains to appropriately configuring different platform characteristics to help minimise unwanted side-effects such as members' reactance and reduced self-esteem, while also increasing dedication to groups and their work. Hence, it helps in capturing and addressing risk requirements as well. Risk management is part of information system and design process, and it is also part of information technology project management. Ultimately, the findings will contribute to the literature of requirements engineering by assisting in the elicitation and customisation of requirements, as well as the design of social behaviour change tools, with a focus on what elements of moderation and functional and non-functional governance should be studied, analysed, and tailored to fit the application domain (McKay et al., 2019). In a broader sense, this thesis aims to promote multidisciplinary systems analysis and design in which social sciences and psychology disciplines aid software engineering processes, especially where design faults might lead to undesirable behaviour and harm to users (Lindohf et al., 2021). The majority of commercial applications for behaviour modification tend to require theory-informed design. They mainly focus on usability and attractiveness and appear to employ engagement components, such as gamification (Lister et al., 2014), in an ad-hoc manner rather than using rigorous research evidence and established theories. The thesis is intended to provide more theory for building such tools.

Presently, a single definition of digital addiction has yet to be reached. Several sub-areas of digital addiction, such as internet addiction, online gaming addiction, problematic internet use, information overload, and cyber-relationship addiction, are commonly considered (Young and de Abreu 2011, Camardese et al. 2015, Ko et al. (2015)). The present version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) has not officially classified DA as a mental disorder (American Psychiatric Association, 2013). However, it recognised that pathological Internet gaming is a growing problem and one worth exploring further.

The term digital addiction (DA) can be described as the problematic usage of digital technologies in a compulsive, impulsive, excessive and hasty manner. According to (Griffiths 2005), digital addiction has characteristics close to those observed in drug, tobacco and alcohol addiction, for example, mood modification, tolerance, withdrawal symptoms, salience, conflict and relapse. Additionally, digital addiction can be linked with several negative life experiences such as work performance problems, e.g. poor academic performance and loss of creativity, emotions problems, e.g. depression and anxiety, personal problems, e.g. procrastination and reduced well-being, social problems, e.g. neglect social contacts and disrupt peer relationship and dietary problems, e.g. forgetting meals and poor quality eating times (Wu et al. 2015). Ha et al. (2006) reported that a few software products give users satisfaction and make up for lack of social skills. That would lead to a high degree of unregulated software interaction, which could socially and psychologically harm an individual.

The rise in digital addiction has also complemented the increase in acceptance and frequency of digital devices use. A survey study in 2018 examined online gambling among those aged 15-20 years, revealing that over half (54%) of respondents who visited online gambling websites were either 'at risk' gamblers or probable pathological gamblers (Sirola et al. 2018). A meta-analysis study conducted by Cheng and Li (2014) which estimates spread rates of Internet addiction across seven world regions. The study covers 80 empirical studies published between 1996 and 2012. The results showed that Internet addiction, a type of digital addiction that affects 6% of the world's population. Kuss et al. (2013) study levels of Internet addiction across students of English university. The study results showed that 3.2 % of students classify as addiction to the Internet, and 21.5% of them are most at risk of Internet addiction. A study conducted in Spain investigated Internet and smartphone addiction among university students over 2006-2017. The study reported that the Internet and smartphones problematic use has been increased and can be associated with negative consequences in 2013 compared to their 2006 counterparts. Also, social networks are considered the main reason for the increase in smartphone use and it is considered that women are more affected than men. (Carbonell et al. 2018).

The prevalence of internet addiction has been documented in epidemiological studies worldwide. Internet addiction was found to be common in both Europe and the United States, according to

research from 7.9 per cent to 25.2 per cent amid adolescents (Ko et al., 2012, Phillips et al., 2012, Bernardi and Pallanti, 2009, Durkee et al., 2012), whereas the Middle-East and Africa had rates from 17.3 per cent to 23.6 per cent (Ghassemzadeh et al., 2008, Adiele and Olatokun, 2014). In Asia, studies have revealed a wider range of prevalence among young people and adolescents, ranging from 8.1 per cent to 50.9 per cent (Kim et al., 2006, Mak et al., 2014). In China, the rates ranged from 6 per cent to 10 per cent (Cao et al., 2011, Lai et al., 2013, Wu et al., 2013). Internet addiction's total prevalence was 26.50 per cent, with serious addiction being 0.96 per cent (Xin et al. 2018). Among males, Internet addiction was greater than among females (30.6 per cent versus 21.2 per cent).

Recently social networks (Facebook, Twitter, Instagram, etc.) have become very popular and familiar. More than one billion people worldwide use one or more social networks regularly (Boyd and Ellison 2007, Andreassen, 2014). Excessive and compulsive social network behaviour is considered a form of digital addiction (James et al. 2017). In 2015 The Statistics Portal (2015) published the overall amount of time spent using social media in the US was 1.7 hours per day, in the UK it was 1.5 hours, and in the Philippines, the average daily use was 3.7 hours (James et al. 2017). Despite the benefits afforded by social networks, some users experience negative personal side effects due to dedicating a significant amount of time and effort to using social networks which can adversely affect studying, jobs, relationships and social lives. Social network addiction is considered a form of digital addiction (James et al., 2017).

Online peer groups to help people combat their digital addiction were first proposed by Alrobai et al. (2016). The focus was on the process through which the group can operate. However, the work has not focused on achieving agreeable and acceptable governance of the groups, e.g., whether to have a moderator and how, the reward system and the monitoring of performance, among others. This thesis will focus on providing a method towards accommodating diversity in peer groups' settings and providing ways for groups to agree on a specific design.

2.2 DIGITAL ADDICTION RISK FACTORS

There are numerous elements that contribute to the development of DA. These factors were categorised into three categories based on the literature review: individual, software, and contextual. To design and develop a successful intervention for DA, it is essential to understand some of the factors that influence individuals to develop a problematic use of digital media. A discussion on these factors is provided below.

2.2.1 INDIVIDUAL FACTORS

The individual factor category can be associated with psychological issues, personality factors, and individuals' social setting. Personality traits, also self-esteem and increased loneliness, can affect how individuals interact with digital technology. Concerning personality, people with

higher narcissistic characteristics may be more likely to develop gaming disorder. (Del Pino-Gutiérrez, 2017). Also, concerning personality factors, the authors (Hong et al. 2019) explored the association between various social aspects. Their results revealed that shyness has an effect on the symptoms of problematic social networks use had been partly facilitated by social anxiety. There is increasing research evidence that shyness is correlated with potential developments of social networks use disorder (Ryan et al. 2011, Roberts et al. 2015). The study result by (Satici, 2019) shifted the view of this relationship and indicated that greater shyness and greater depression were the effects of negative usage patterns, which also adversely affect users' subjective well-being. Psychological problems could also contribute to the problematic use of DA. For example, concerning digital gaming, the literature has mainly emphasised depression (Kim et al. 2006). Donnelly and Kuss (2016) stressed that social network usage time and addictive use were related to depression symptoms.

2.2.2 SOFTWARE FACTORS

Some characteristics of the medium play an important role in users' addictive behaviour. However, the medium's effect on addictive behaviour has gained less attention in the literature than personal characteristics and environmental factors. Few studies clarify internet addiction by recognising which internet factors increase or decrease excessive user usage (Chung et al. 2019). Young and de Abreu (2011) declared that some software could act as causes facilitating continuous usage. This suggests that patients should avoid visiting specific websites or even such apps. The researchers drew attention to major awareness issues and gaps. Some internet applications have unique triggers built into them. We still need to address what these technologies are, the reason they are so addictive, and what are the causes and addictive properties.

The authors in Lee et al. (2014) noted that external indicators such as notifications might cause problematic user behaviours. The seductive and rewarding properties unique to the internet, which attract users have been discussed (Song et al. 2004, Leung 2004, Chen and Kim 2013). When these satisfying experiences are mastered and customised, users want to spend increasing time online than they initially expected (Chen et al. 2009). Personalisation was defined by Nielsen (1998) as a feature for customising content and services for individual users based on their models and preferences privacy options for apps may cause inappropriate social network use. Yogo et al. (2012) developed an SNS-specific incentive-rewarding system to share content with the public network rather than only their peers. Their mechanism makes use of social media features like page view counts and likes to encourage people to share content with the public network rather than only their peers.

There is a paucity of systematic and robust studies examining the user interface's role in worsening addiction in the literature. However, since the user interface is where all user interactions take place, this study claims that one of the most important components of DA is this aspect. The

advantages of the user interface, such as usability, ease of internet access, personalisation and multitasking, may also play essential roles in DA facilitation. Nevertheless, to explain the degree and importance of this effect, further studies need to be performed.

2.2.3 CONTEXTUAL FACTORS

Despite the abundance of applicable theoretical recommendations on the significance of context for behavioural development (Bronfenbrenner and Morris 2006, Douglas et al. 2008, Griffiths, 2005), comparable research results concerning internet addiction are scarce. Contextual factors may also be closely correlated with DA. Young and de Abreu (2011) claimed that it is presently anticipated that individuals are available at any time and everywhere that can increase stress and lead to addiction. Douglas et al. (2008) proposed that social context factors can act as internet addiction antecedents. They claimed that user's internet social state could lead to feelings of isolation and/or boredom within their real context, strengthening internet addiction behaviours digital relationships are used to achieve feelings of relaxation and community. Though some attention has been given to the contextual or place-specific effects of internet addiction on health, only regional locations have been included in this research (Cheng and Li 2014, Li et al. 2014).

Developing for behavioural improvement, whether it is to make cyberspace increasingly interactive and immersive, or to make users more mindful and in control of their usage, can lead to unintended outcomes by neglecting behavioural context. Members can overcome addictive habits in online peer groups, experience recurring relapse and denial episodes. Instead of fixing it, this can trigger behavioural contagion and reinforcement of behaviour. In both its design and management processes, such a system may also be a double-sided sword (Alrobai 2018). Necessarily, in addition to the significance of discussing the role of individual pathology in understanding behavioural change, there is a tendency to ignore contextual and systemic views. To put it another way, it is crucial to check and maybe influence the situation where the behaviour happens in order to influence behaviour. However, fixing the situation will also entail changing the broader structure that hosts the situation and retains it. As a result, studying the peer group ecosystem and its outer and inner dynamics will be fundamental to accomplishing better and more complete governance of their formation, interactions, and maintenance and to accomplish greater acceptance and usefulness.

2.3 DIGITAL ADDICTION TESTS AND MEASUREMENTS

Many types of research on digital addiction, e.g., addiction to social media have focused on creating measurement scales, suggesting that further research is needed into software design practises and intervention technologies. Table 2 presents some of the measurement scales that are widely used.

TABLE 2: DIGITAL ADDICTION MEASUREMENTS SCALE

Internet Addiction Measurement Scales	Authors	Number of Items	Theoretical Basis
Chen Internet Addiction Scale (CIAS)	Chen et al. 2003	26	Substance dependence and pathological gambling
Compulsive Internet Use Scale (CIUS)	Meerkerk et al. 2009	14	Substance dependence and pathological gambling
Generalized Problematic Internet Use Scale (GPIUS)	Caplan 2002	29	Cognitive-behavioural theory
Internet Addiction Test (IAT)	Young 1998	20	Pathological gambling
Online Cognition Scale (OCS)	Davis et al. 2002	36	Cognitive-behavioural theory
The Social Media Disorder (SMD) Scale	van den Eijnden et al. 2016	9	Social media use disorder
The 6-item Bergen Social Media Addiction Scale	Andreassen et al. 2017	6	Social media addiction
Thatcher's Problematic Internet Use Questionnaire (TPIUQ)	Thatcher and Goolam, 2005	20	Pathological gambling
Virtual Addiction Survey (VAS)	Greenfield, 1999	10	Pathological gambling
Online Cognition Scale (OCS)	Davis et al. 2002	36	Cognitive-behavioural theory
Internet Related Problem Scale	Armstrong et al. 2000	20	Substance abuse
Problematic Internet Usage Scale	Gürcan 2007	33	Problematic usage of the internet

2.4 DIGITAL ADDICTION TREATMENT APPROACHES

The continuing controversy and the lack of consensus on internet addiction's clinical status in many countries worldwide have not stopped the increasing demand for internet-related treatment (King et al. 2011). According to (Wendel 2013), individuals have the potential to alter their attitudes and modify them. As such, treatment plans should be built on this basis. Treatments may also include a number of approaches from various backgrounds since the addiction is induced by a ranging variety of elements. Treatment methods for DA are minimal, as this form of addiction is not yet identified in the official manuals of psychological disorders, e.g. Diagnostic and Statistical Manual of Mental Disorders (DSM). The explanation is that no concrete evidence indicates identifying DA as a mental illness. However, several studies have been undertaken to find effective treatment applications, as addiction-like symptoms have become very apparent.

Considering the available strategies for the treatment of digital addiction, the researcher will help create a deep understanding of the approaches used and how they can inform a better design of online peer group to help control or manage DA.

2.4.1 COGNITIVE-BEHAVIOURAL THERAPY

Cognitive-Behaviour Therapy (CBT) is a common approach to treat various psychological disorders (Young and de Abreu 2011, p.156). CBT may provide very efficient care to help the internet addiction rehabilitation process. The therapy suggests that by altering thought patterns, behaviours can be manipulated and improved. CBT has also been used to treat problems of mental health and substance use. The methods presume that addiction is a way of coping with stressful conditions, dysphoric moods and social pressure. CBT's primary goal is to assist patients modify their feelings and attitudes to facilitate healthy long-term behaviours. This is by showing them how feelings that cause addictive emotions can be recognised. Patients are advised to develop specific coping skills as a relapse or recurrence prevention technique during the recovery (Winkler et al. 2013 and Griffiths et al .2015).

Young (2011) developed a specialised version of the (CBT) known as the Cognitive-Behavioural Therapy for Internet Addiction (CBT-IA) as an inclusive treatment method. Managing users time online and offline is a preliminary aim of CBT-IA. The CBT-IA consists of the following phases.

- **Phase 1** – This phase focuses on examining and improving the computer and non-computer behaviour of problem users. Computer behaviour is concerned with real online usage, with the primary objective of abstinence from problematic platforms, thus ensuring regulated use of the computer for legitimate purposes (Young 2011).
- **Phase 2** – Cognitive therapy is used in the second phase to counter denial that is often common amongst Internet addicts and to counter the rationalisations that explain excessive online use. This requires a thorough examination of current use to recognise and remove causes and then facilitate time management skills. Therapy initially deals with the negative cognitions that act as causes that initiate binge behaviour over the Internet (Young 2013). To break this cycle, CBT-IA makes use of cognitive restructuring. Constructive restructuring helps to carefully examine the client's thoughts by questioning them and re-writing their negative thinking. As a result, CBT-IA may help clients realise that they are engaged in the Internet to escape situations or emotions. Cognitive restructuring can assist clients to reassess how fair and useful these interpretations are. For example, a client who plays online games to gain self-esteem will start to see that they are engaging with the Internet to meet needs that are not being met in their daily lives (Young 2013).
- **Phase 3** – In this phase, the harm reduction therapy reduces the addiction's negative effect and is used for lasting recovery and relapse avoidance (Marlatt et al. 2001). Harm reduction therapy addresses any co-existing aspects linked with the development of problematic internet usage. This process is often referred to as "Harm Reduction

Therapy” that underlines a problem that caused DA to be resolved. This involves the effect on the problematic user’s personal and working lives and the emotional effect.

2.4.2 MOTIVATIONAL INTERVIEWING (MI)

Motivational Interviewing can be defined as

"a directive, client-centered counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence" (Rollnick and Miller 1995, p.325).

MI approaches seek to involve addicts in meaningful and confrontation-oriented conversations to assist them reach own real objectives and how their actions could affect them. It is defined as an autonomous, participatory and collaborative method (Young and de Abreu 2011). Four key principles guide MI: (i) express empathy, (ii) develop discrepancies, (iii) roll with resistance, and (iv) support self-efficacy (VanWormer and Boucher 2004). The approach has been identified as an efficient strategy that healthcare providers can use to assist pre-contemplators and contemplators (Diclemente and Velasquez 2002).

A significant part of this strategy is working closely with a client. The explanation is that the counselling process generally starts with a great degree of confusion from both the counsellor and the client regarding the objectives and the client's ability to accomplish them (Heather and Stockwell 2004). Typically, this technique is target-oriented, inspirational-based, patient-centred and heavily reliant on the counsellor's expertise to guide the process (Young and de Abreu 2011). This approach's central concepts are that a user is required to seek support, accept accountability, seek alignment with individual expectations and beliefs, and improve self-esteem (Miller 1983).

2.4.3 INPATIENT AND OUTPATIENT CARE

There are two types of treatment for addictive behaviours: inpatient and outpatient. Inpatient facilities usually involve short-term residential care and are also used for acute detoxification. Also, inpatient care provides an intensive, highly standardised treatment. More long-term maintenance is offered by outpatient settings and can be intensive, modelled after day treatment services, or typical involving weekly group therapy sessions. More focus is being put on outpatient care at all stages of treatment due to concern about increasing health care costs (McCaul & Furst, 1994). Other treatment factors, such as modality, treatment length and characteristics of the therapist, tend to directly affect treatment (Heather and Stockwell 2004).

In 1996, the Illinois Institute for Addiction Recovery started providing services to users diagnosed with DA, such as video game and shopping addiction (Young and de Abreu 2011). Illinois Institute for Addiction Recovery offers evaluation by a licenced addiction specialist qualified to diagnose this disorder and treat it. The evaluation is to determine the level of treatment needed. Being 18 years of age, becoming a help-seeker, and self-restraint from other addictions, such as

narcotics and alcohol, are also the conditions for admission (Illinois Institute for Addiction Recovery 2017). The institute provides both inpatient and outpatient care for patients.

2.5 MODALITIES FOR DELIVERING PREVENTION AND TREATMENT

Addictive behaviours may be treated in a variety of ways. Modality refers to the environment in which the treatment or a preventive strategy is delivered.

2.5.1 SELF HELP

Self-help treatments are described as standardised psychological treatments that the patients themselves in their own homes can work through individually (van Straten and Cuijpers 2009). Self-help seeks to help people achieve behavioural treatments without entering therapy programmes (Lancaster and Stead 2005). It focuses primarily on improving peoples trust in their ability to accomplish their own goals, i.e. self-efficacy (Watkins and Clum 2007).

Self-help typically takes written content, although other types of media such as video or audiotape, can be used. These materials can be circulated and used on a far larger scale than therapist-delivered counselling. Further interest in this field was sparked by the emergence of emerging technologies, including video and computers, which provide a tool for further personalisation of self-help materials (Curry 1995, Strecher 1999). This modality offers a extensive variety of benefits, such as reaching larger communities, cost-effectiveness, minimising anxiety, for example, the stigma of seeing therapists, increasing trust, and offering coping strategies to deal with other feelings related to the primary condition. Interventions based on this method, however, frequently neglect empirical assessment (Watkins and Clum 2007).

2.5.2 COUNSELLING THERAPY

Various approaches can be followed in the counselling format; motivational interviewing and cognitive behavioural therapy are two examples (Young and Abreu 2011). Counselling therapy is a confidential and counsellor-led approach in which people go to counselling sessions to talk about their problems and emotions. Usually, a counsellor gathers personal details and interpretation of the clients' experience meanwhile acting as involved and attentive listener to discuss their opinions of view and highlight those that require to be explained further. The goal is to assist clients in identifying positive alternatives that are free of prejudice.

2.5.3 SUPPORT THERAPY

Support therapy will help address the maladaptive cognitions that contribute to emotional challenges and provide a chance to create real-life relationships. Two key sources of support can be used: natural support, such as friends and family, structured support, e.g. professional and

community (Hogan et al. 2002). If counsellors are involved, peer groups may be categorised as professional, whereas communal if peer-led. There are two key types of help in both cases, i.e. direct support and indirect support defined by (Hogan et al. 2002).

- **Direct support** may take the form of (i) emotional, such as empathy and acceptance, (ii) informational, such as advice and guidance, and (iii) instrumental, such as programmes and financial assistance offerings.
- **Indirect support** is concerned with making "permanent improvements in support happening naturally, for example developing personal skills and offering solutions to assist a person achieve the desired improvement. For instance, in support therapy, providing people to communicate their emotions and rehearse that can strengthen their coping and social skills and assist minimise denial.

Help counselling is more closely linked to official support, in which active participation is required in meaningful conversations and specific problem-solving undertakings. Some structured therapy includes family members to re-establish damage relationships (Hogan et al. 2002). Some researchers also classified self-help as official assistant in which support is given by particular roles (Hogan et al. 2002) and one setup (Bassuk et al. 2016). Many support therapies follow the Alcoholic Anonymous 12-step model, which includes guiding guidelines for rehabilitation (VandenBos 2007). The experience of those who have recovered successfully can also be seen as a source of support (Mead and MacNeil 2006).

2.5.4 ONLINE BASED THERAPY

Internet based therapy is defined as “any professional therapeutic interaction that makes use of the internet to connect qualified mental health professionals and their clients” (Rochlen et al. 2004 p.2). Online therapy can be delivered via e-mail, web sites or chat-based interfaces. Concerns are posed regarding the complete dependence on this approach and whether it should be used in together with in person meetings, for example, at least at the beginning of counselling. The effect of clients being geographically isolated from their counsellors is one of the issues of this modality.

Research evidence has shown that online therapy can have several benefits, for example, getting individuals more relaxed and less daunted (Riva et al. 2017). Other advantages of this modality can be linked to the online space’s real-time, interactive and immersive nature. It also encourages self-control by allowing self-awareness and behaviour monitoring and visualisation. Concerning DA, online therapy may be contentious, since the digital space is both the platform for the issue and the solution. Therefore, research is still required on methodical design and controlled engagement and online peer groups.

Online therapy can also have some challenges, e.g. missing nonverbal, i.e. no access to nonverbal habits that are unquestionably vital elements in the therapy process and time delays, i.e. therapy

done via e-mail is asynchronous and has an integrated time delay that changes the nature of the counselling method (Rochlen et al. 2004). Skill deficiency is another challenge, i.e. to handle the medium, both the therapist and the client must be able to write and type as well as be computer literate (Suler 2001).

2.6 BEHAVIOURAL CHANGE THEORIES AND MODELS

Behaviour change theories intend to minimise discrepancies and encourage people to take their desire to change their behaviour and put this into action to yield the desired results. For instance, this could involve persuading somebody to make a formal plan to realise a particular goal (Webb et al., 2010).

Various behaviour change theories have been proposed in an attempt to change addictive behaviours. Webb et al. (2010) conducted a review of numerous behaviour change theories applied in the field of addiction but overlooked theories derived from social and health psychology. The literature review aims to appreciate the possible applications of behaviour theories to manipulate people's addictive behaviours. The current section summarises eight different theories to appreciate the principal dynamics of behavioural change better. The theories reviewed in this section are: the theory of planned behaviour; social cognitive theory; control theory; goal-setting theory; Cialdini's principles; the FOGG model; technology-assisted behavioural change; and technology-assisted persuasive techniques.

2.6.1 THE THEORY OF PLANNED BEHAVIOUR

The theory of planned behaviour (TPB) was suggested by (Ajzen, 1991). This theory suggests that the intention to perform behaviours can be forecast based on three elements (see Figure 2): attitude towards behaviour, subjective norms and perceived behaviour regulation. TPB is an expansion of the theory of reason action (TRA) (Bagozzi, 1986) by including measures of perceived behaviour control (PBC) that reflect the supposed ease or complexity of executing a behaviour and carries the same sense as self-efficacy (Terry and O'Leary, 1995). Perceived behaviour control is held to influence both intention and behaviour, including PBC to TRA, to forecast behaviours that were not under full volitional control (Armitage and Conner, 2001).

The TPB is suitable for behaviour change and identifies that what needs to change is determined by changes in attitudes that affect behaviour rather than developing intentions and PBC. However, the TPB, as with other social cognitive models, does not offer suggestions for change but instead offers scarcity of knowledge about how to improve one's behaviour.

The TPB can also be mapped to the Transtheoretical Model's first stage (Prochaska and DiClemente, 1983, Prochaska et al., 2013). The raising of consciousness, drastic relief, environmental re-evaluation, and social liberation are examples of these processes. Self-liberation

is concerned with a person's belief that they can change their ways and can be applied to help select suitable intervention strategies. For instance, if the cause of concern results from inaccurate perceptions (e.g. "people are unable to reduce their use of digital technologies"), it would be appropriate to apply the persuasive principle normative impact (Torning and Oinas-Kukkonen, 2009).

This theory's application would first relate to peer groups' perception as a useful and acceptable technique in peer groups. In other words, the perception of ease and the perception of usefulness need to be positive as a precondition for the technique's success. Also, this expands to the other techniques applied within the peer group online, such as the reward system and the penalties and feedback. Diversity in users' requirements and preferences would necessitate an argumentation and negotiation process at the start and this will be the subject of this thesis.

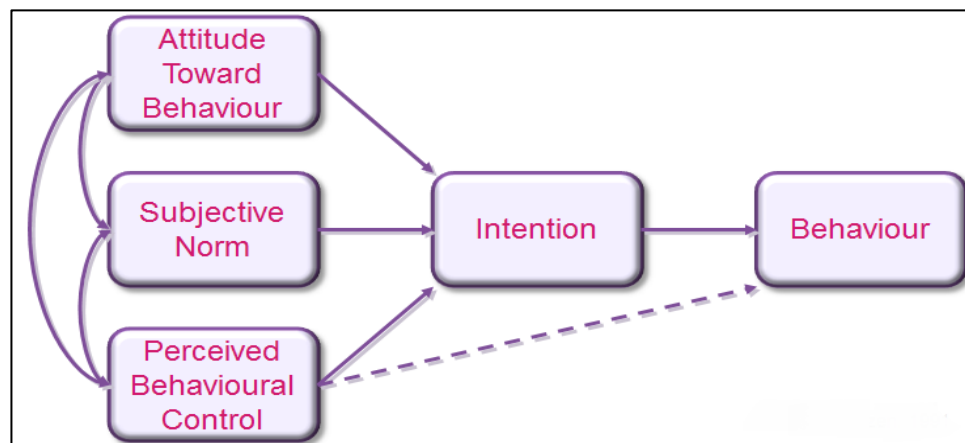


FIGURE 2: THEORY OF PLANNED BEHAVIOUR (AJZEN, 1991)

2.6.2 SOCIAL COGNITIVE THEORY

Social cognitive theory (SCT) was suggested by Bandura (1986), and it shares some of the same main variables as social cognition models (see Figure 3). For example, future behaviour is thought to be influenced by one's intention. It shares the TPB's core concept (i.e. intention). It does, however, emphasise self-efficacy, which is described as the "foundation of human agency" (Bandura, 2001) and has direct effects on behaviour as well as other central predictors of behaviour such as intentions and outcome perceptions (Webb et al., 2010). SCT claims that individuals select what difficulties to do based on their self-efficacy beliefs, the amount of time to spend on the effort, how long to endure in the face of barriers and setbacks, and whether setbacks are motivating or inspiring demoralising (Bandura, 2001).

Unlike social cognition models, SCT views the connection between beliefs and action as a mutual learning mechanism in which individuals choose, respond to, and learn from their experiences (Bandura, 2001). People create positive motivations when they see others in similar circumstances perform the behaviour and achieve the intended result, which increases inspiration and raises the

probability of behavioural change (Mark et al., 2011). This corresponds to the social learning concepts found in Torning and Oinas-Kukkonen (2009) persuasive techniques. It is possible to assume that these theories complement one another, resulting in more successful and long-term behavioural improvement.

In peer groups, SCT enjoys further support through the possibility of receiving information about the success stories of the other members as well as common obstacles and workarounds. Hence, a member can be empowered to learn more and set up better targets. Still, the risk is associated with the lack of self-esteem, resulting in some members viewing themselves in a less favourable position in that comparison. Thus, moderating peer groups to get the maximum from such social learning is required.

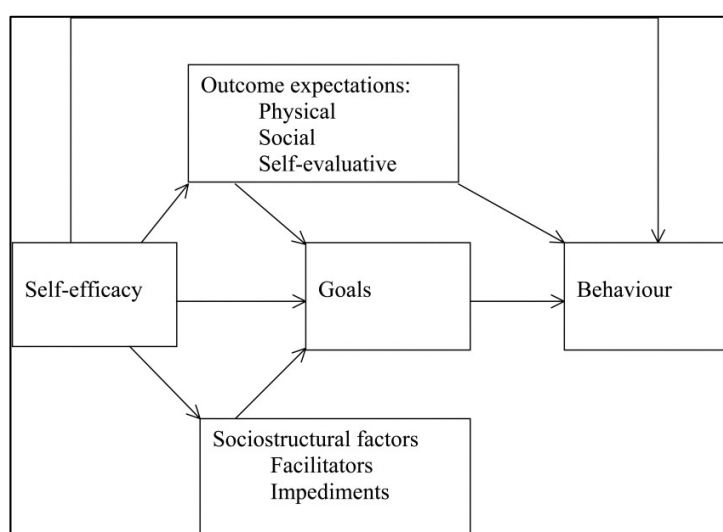


FIGURE 3: SOCIAL COGNITIVE THEORY (BANDURA, 2001)

2.6.3 THE CONTROL THEORY

Carver and Carver and Scheier (1982) described the control theory as “a general approach to understanding the self-regulating systems” (see Figure 4). Control theory uses goals as a point of reference to establish where the present behaviour stands relative to the desired outcome. In essence, it is a series of feedback loop models but is not often applied as a baseline for those seeking to manipulate addictive behaviours. Self-regulating systems make extensive use of this concept of the behavioural monitoring. However, the aspect of this theory that proves problematic when applying it to addictive behaviour is goal setting (Webb et al., 2010). Be that as it may, the theory offers a useful means of incorporating other processes and self-regulation theories, for example, goal setting theory and the health belief model (Webb et al., 2010). Moreover, this theory’s ability to help tackle DA will be enhanced by deploying software-assisted monitoring and feedback.

In the context of peer groups, the goals can be set in different styles, including the directed style or the democratic style, and each would have a different impact on the adherence and pace. Feedback can be provided by a software monitor or also by peers and by a monitor. Hence, Control theory would benefit from both automation and peer evaluation. Risks are associated with that such as subjectivity and bias.

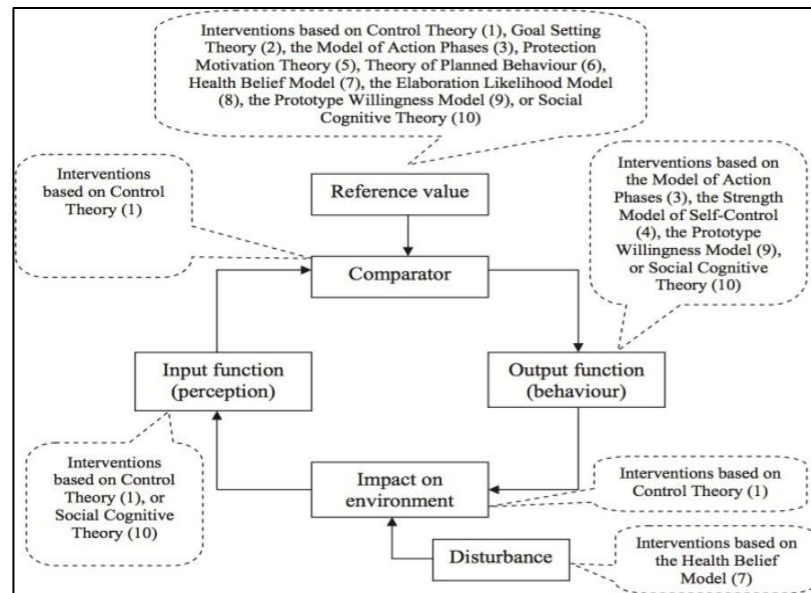


FIGURE 4: USING THE CONTROL THEORY TO INTEGRATE OTHER MODELS FOR SELF-REGULATION

2.6.4 TRANSTHEORETICAL MODEL

The Transtheoretical Model (TTM), which is also known as Stages of Change, is widely used to distinguish individuals who are not planning to change their actions but are thinking about it, planning to, and already in the process of change. Researchers and practitioners broadly know the TTM model, explaining how individuals gain good behaviour or change problem behaviour. The TTM model proposes mapping individuals to one of five primary phases: pre-contemplation, contemplation, planning, action, and maintenance (Prochaska and DiClemente, 1982). This model suggests that people at the same level should go through the same kinds of obstacles and be assisted by the same kind of intervention. The TTM aims to incorporate key processes of behavioural change, e.g. dramatic relief, self-liberation, and contingency management, and map them to change stages (Sutton, 2001). Figure 5 represents the processes and stages they belong to, and some processes can be found in more than one phase.

Precontemplation	Contemplation	Preparation	Action	Maintenance
Consciousness Raising Dramatic Relief Environmental Reevaluation	Self-Reevaluation	Self-Liberation	Contingency Management Counterconditioning Stimulus Control	

FIGURE 5: STAGES OF CHANGE IN WHICH PARTICULAR PROCESSES OF CHANGE ARE EMPHASISED (PROCHASKA AND DICLEMENTE, 1982)

2.6.5 THE HEALTH BELIEF MODEL (HBM)

The Health Belief Model (HBM) predicts that messages that better target perceived barriers, benefits, self-efficacy, and danger may result in optimal behaviour change. The HBM's underlying assumption is that individuals must feel directly threatened by a health threat in order for preventive measures to be implemented Nisbet and Gick (2008). This model as it promotes the principle of self-efficacy as its theoretical base (see Figure 6). It is possible that if people are in denial about their addictive tendencies regardless of the presence of appropriate signs, this model will not be appropriate when coping with addiction. The authors in (Webb et al., 2010) claim that there is no available work in the study of addiction for HBM-based intervention. Nevertheless, it may offer an appropriate model for addiction to the internet or social media, regardless of no scientific research in this area. According to (Wang et al., 2016), some elements of the HBM are risk factors for Internet addiction, such as perceived benefits and perceived barriers (see Table 3).

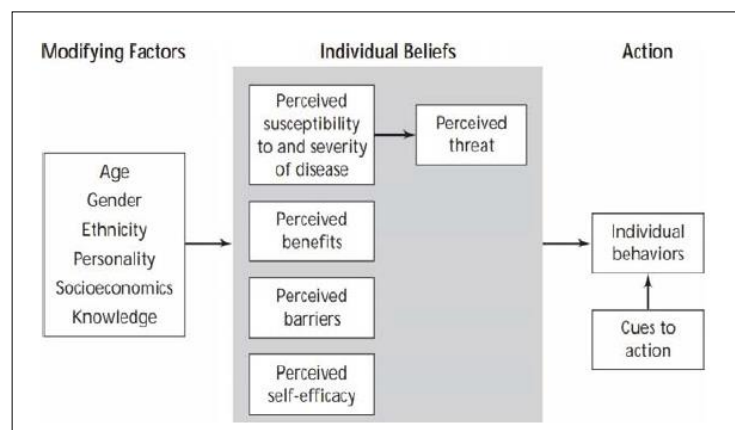


FIGURE 6: HEALTH BELIEF MODEL COMPONENTS, (GLANZ ET AL., 2008)

TABLE 3: COMPONENTS OF THE HEALTH BELIEF MODEL (JONES ET AL., 2015)

Components of the health belief model	Brief description
Perceived susceptibility	A state or condition is the subjective understanding of the danger the person is at.

Perceived severity	Subjective assessment of the severity of the effects linked with the state or situation.
Perceived threat	This combined quantum could be seen as representative of the degree of motivation a person has to act in order to prevent a specific result.
Perceived benefits	The beneficial effects of taking health measures to offset a perceived danger were subjectively known. This understanding will be affected not only by particular proximal variables, but by the overall 'health motivation' of a person.
Perceived barriers	The reasons of taking the action, or overcoming expected obstacles to taking it, were considered to be negatively valued.
Perceived self-efficacy	Belief in the willingness of one to execute a specific behaviour.
Expectations	This can be seen as symbolic of the degree to which the individual will attempt to take a given action.
Cues to action	Reminders or reminders to take actions constant with an aim, ranging from ads to health practitioners, family members and/or peers' personal communications.
Demographic and socio-economic variables	These include factors such as age, race, ethnicity (cultural identity), education and income may include these.

2.6.6 GOAL SETTING THEORY

The goal-setting theory's underlying assumption is that the simple process of identifying a goal sets in motion a positive stimulus that benefits performance. More specifically, the theory assumes that two dimensions determine performance: specificity and difficulty. In terms of specificity, the theory suggests that more effective results are achieved when the goals are specific (see Figure 7). For instance, general targets such as 'try your hardest' that do not have a specific reference point are unlikely to be highly effective. A positive linear relationship exists between how difficult a goal is and the level of performance in terms of difficulty. As such, difficult goals generate the best possible performance, whereas easy goals result in underperformance. When people face a challenging goal, the challenge involves encouraging them to maximise their effort. As a general rule, meta-analyses suggest a linear relationship between a goal's difficulty and subsequent results (Locke and Latham, 2004, Locke et al., 1981). However, there is a turning point at which extreme goals are likely to result in people giving up and, therefore, underperforming (Erez and Zidon, 1984). Moreover, most academic studies examining goal-setting theory have been conducted in laboratory settings. There is relatively little empirical research indicating that setting difficult goals confers positive benefits in terms of health-related behaviours.

By setting suitably challenging targets, the goal-setting theory could be applied to help people change their addictive habits (Locke and Latham, 2004, Locke et al., 1981). Moreover, applying goal-setting theory in this domain could alter the reference value's nature in the control process.

Whereas goal-setting theory has been widely used to improve employees' productivity, it has also been shown to aid individuals decreased their consumption of alcohol and stop smoking. (Whitlock et al., 2004) studied a range of behavioural counselling interventions used to tackle the excessive use of alcohol and found that all of the strategies that yielded significant results shared at least two of the three aspects: feedback, guidance and goal-setting. Meanwhile, Ussher et al. (2003) applied goal-setting as part of a strategy to encourage people to stop smoking by taking more exercise.

Setting goals in peer groups can be done in various ways and at different stages. Goals can be set collectively by all group members, or individually by members themselves or can be allocated by moderators. This can be done at the start of the group establishment and then be broken down to proximal goals, i.e., small goals, on an iterative basis. The agreement of such goal-setting protocol by the members is essential for their acceptance and adherence. The thesis contributes to providing variations of goals setting mechanics and aid groups to tailor one strategy for selecting a suitable strategy. A risk here is that the groupthink (Carroll et al., 1997, Alrobai et al., 2016b) may lead groups to a direction that is only temporarily valid and distant from their real situation and behavioural targets.

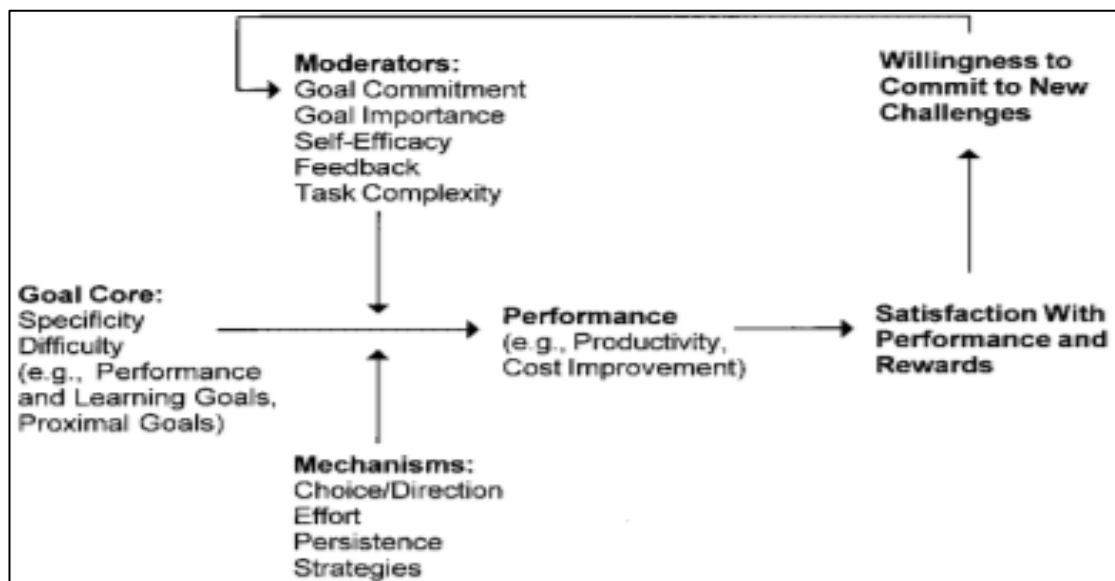


FIGURE 7: IMPORTANT ELEMENTS OF THE GOAL SETTING THEORY (LOCKE AND LATHAM, 2002)

2.6.7 CIALDINI'S PRINCIPLES

Cialdini (2009) identified several evidence-based persuasive principles that could be used to change how people behave. The principles are based on the psychology of persuasion, and there are six elements to Cialdini's model:

1. **Reciprocity:** individuals tend to repay others who provide them with advantages such as behaviour, services, and gifts. There are two ways in that this can be used. The first is to

oblige a person to repay a favour. The second is when a person is offered an unattractive proposition, e.g. asked to pay a high price and subsequently a more attractive alternative, e.g. a lower price hoping that this will encourage the alternative to be accepted.

2. **Commitment and Consistency:** Individuals who are likely to commit to their goal or idea would help persuade individuals to do certain activities. Attention is centred on individual alignment (remaining consistent when committing to do something). For example, a car insurance company who commits to rewarding their perfect drivers with no claims needs to keep that tradition so that clients are persuaded to remain loyal.
3. **Social proof:** witnessing how others behave influences their actions (complying with social norms). This helps to develop a sense of belonging and avoid being punished.
4. **Liking:** When a person likes someone, they feel an obligation to them. People often like each other when there is a similarity, trust or an attraction.
5. **Authority:** people often feel obliged to do as those in authority instruct them to do (e.g. the police, parents or schoolmaster).
6. **Scarcity:** people are inclined to prevent scenarios that lead to loss or a sense of regret. For example, a post on social media available for a few minutes would persuade people to share it with more people.

Cialdini's principles can appeal to different degrees to peer group members. While some appreciate authoritative messages, e.g. those supported by research, others may like more social proof messages, e.g. that people who reduced their usage felt better about themselves. The liking principle also suggests that the group coherent and the moderator, if it is moderator, shall be close to the members both in culture and attitude. The thesis will investigate the consensus-building process for how online platforms for peer groups are built, including the influence elements used.

2.6.8 FOGG'S MODEL

Fogg's model (2009a) can be used to recognise the obstacles that prevent people from exhibiting a particular behaviour. According to Fogg's model, three elements are required to act: ability, motivation and a trigger (see Figure 8 below). *Ability*: the approach will encourage behaviour that is already achievable rather than attempting to coach the individual to avoid something that is considered difficult to achieve. *Motivation*: this can be described in terms of hope vs fear, pleasure vs pain, social acceptance, and rejection. *Trigger*: this can take various forms such as a facilitator (making something simple for those with little ability), spark (to stimulate those with little motivation) or a signal (reminding those with the ability and motivation that a task needs to be performed).



FIGURE 8: FOGG BEHAVIOUR MODEL (Fogg, 2009a)

The peer group's online version will benefit from Fogg model, especially towards the signal, which means the reminders for the group members and individual performance messages' personalisation. Fogg techniques to persuasion such as surveillance and self-monitoring are also powerful tools that are naturally aligned with peer groups, i.e., collective and individual performances. Fogg's eight steps process to build persuasive techniques (Fogg, 2009b), will inform our method, especially at the early stages of group forming and governance agreement.

2.7 TECHNOLOGY-ASSISTED BEHAVIOURAL CHANGE

Addiction to digital technologies could impact health through influence mental health. People with mental health problems find that behaviour change technology based on software tools design helps provide a wide range of service for those who cannot access health care service. The service could be reminding and monitoring, provide information, mutual support and guidance (Bennett et al., 2010).

The vast majority of the empirical research concerning DA has been performed from a social science point of view (Ryan et al., 2014). An example of such research includes that of Cam Çam and Isbulan (2012). Numerous empirical studies concerning DA have sought to develop measurement scales for SNSs (Andreassen et al., 2012, Elphinston and Noller, 2011). Therefore, future work would be advisable to explore software design practices such as HCI and focus attention on DA's intervention systems (Ryan et al., 2014).

Previous research studies concerning digital intervention platforms have focused on Internet addiction and smartphone addiction. Su et al. (2011) examined Internet addiction and developed an effective intervention system to help students scale back their use of the Internet. Su et al. proposed interventions based on online plans that were supplemented by reminder cards.

Meanwhile, Lee et al. (2014) developed an intervention system to help tackle smartphone addiction based on four core functions: tracking, archiving, analysing, and interventions and treatment. By tracking each individual's mobile use, the system devised a series of tailored interventions.

Ko et al. (2015a) reviewed the efficacy of 41 different intervention apps for smartphone users and assigned each of these to one of four themes: task distraction elimination; diagnosing smartphone addiction; overuse interventions; monitoring children's use. Moreover, it was observed that these systems employ various persuasive techniques including usage tracking, self-monitoring and app locking features. However, Ko et al. (2015a) noted that the main intervention strategy was the main task support element Torning and Oinas-Kukkonen (2009) Based on the insight gained from their research, (Ko et al., 2015b) devised a means of reducing smartphone use that relies on self-regulation following social cognitive theory. The proposed method comprises the following elements: goal-setting, self-monitoring, social learning and competition.

These initially proposed interventions' apparent success has resulted in further research into using self-regulation to tackle DA. The proposed methods offer support for those experiencing addiction, but they still require the addict to modify their actions positively. For example, Ali et al. (2015) recommended using interactive warning labels incorporating timers and avatars to help quell DA. Meanwhile, Ko et al. (2015b) developed an innovative approach to self-regulation of smartphone use based on social cognitive theory. This involves encouraging groups of people to share details of their smartphone use.

However, it is essential to note that all of these strategies assume that individuals have the wherewithal to change their ways in a manner that reflects their circumstances. Also, a paucity of research looked at the group's effect as part of the persuasive techniques used. They mostly focused on technology interaction with people individually. The research has often come up with the technology to try in a top-down approach, i.e. the technology was developed first then tried for its effectiveness. In this research, a bottom-up approach is proposed. The technology designs, i.e., the online peer group setting, results from the interaction between the members and other stakeholders such as the moderators and behaviour therapist. Our proposition here is that such a democratic approach will increase acceptance and adherence and loyalty to the group.

2.7.1 THE ADOPTION OF TECHNOLOGY IN HEALTH CARE

Research has indicated an increasing need for new methods to delivering health interventions in mental health practices since psychological services have restricted minimal resources (Leigh and Flatt, 2015) The growing need for cost-effective, time-effective and preventive healthcare is forcing drastic changes in existing healthcare systems, requiring then to fully utilise modern technological capabilities, including information technology (Christodoulakis et al., 2017).Such

need has led to a substantial financial investment in various areas in healthcare, e.g. electronic medical records, diagnostic imaging, drug information systems and telehealth (Christodoulakis et al., 2017). In health care management, IT solutions have created technological advances that could resolve this limitation. E-health technology for behavioural change is one of those technologies that can be used to instigate expert interventions and encourage wellness and well-being.

E-health technology for behavioural improvement is an evolving subject where its use is gradually experienced in many fields related to addiction. For example, for alcohol abuse, online intervention is used to facilitate healthy drinking (Bewick et al., 2008). The developments in IT and Web 2.0 have also opened up new opportunities, such as more informed, context-sensitive, ongoing and social online interventions. For example, mobile apps' use to alter behaviour is increasing, such as for smoking cessation(Lüscher et al., 2019), and diet and eating disorder (Pagoto et al., 2013),among others.

2.7.2 THE RAPID-GROWTH MARKET AND RISKS

According to a new study looking at these applications market size, there will be 1.7 billion devices that have access to E-health platforms by 2017 (Research2Guidance, 2013). Since 2007, investments in electronic medical records, diagnostic imaging, medication information systems and telehealth services have yielded an estimated \$13 billion in benefits (Christodoulakis et al., 2017). By the end of 2017, revenue from this market will increase to \$26 billion produced from paid downloads and the supporting services and hardware sales. These projections showed that this technology has a lot of potential and is widely accepted. These forecasts indicated that this technology has a lot of potential and is widely accepted. There is limited reliable proof of the efficacy of the software, despite this pattern. The growing number of people who use these apps, as well as the high rate of adverse side effects, for example, technology dependence and self-diagnostic anxiety, maybe critical (Leigh and Flatt, 2015). In the prediction period from 2020 to 2027, eHealth's demand is projected to gain market growth. Data Bridge Market Analysis analyses the demand to account for USD 310.09 billion by 2027 (Pharmiweb.com, 2020).

Despite this pattern, credible evidence of the effectiveness of these applications is lacking. The growing number of people who use these apps, as well as the high rate of negative side effects like technology dependency and self-diagnostic anxiety, may be important.

2.7.3 E-HEALTH TECHNOLOGY AND DESIGN CONSIDERATIONS

Influencing user behaviour via design has considerable potential for social gain, mainly where decisions about human behaviour and product usage directly affect the environment. Design considerations should be part of every plan for behavioural change where design could play a part. In addictive behaviours, the interventions approaches are proposed to contemplate designing

to prevent causing behaviours and substitute them with healthier ones. Consolvo et al. (2009b) identified five design considerations for behavioural change technologies that can promote daily behaviour improvements. For example, e.g. the increase and maintenance of physical activity must satisfy people evolving requirements or may probably fail. The five stages are (i) engagement, i.e. the technology must retain user interest and accommodate changes in user target and ability, (ii) relevant behaviours, i.e. the technology should account for the range of related behaviours that may lead to behaviour change and not restrict help to those it can automatically assume (iii) irregular activity, a persuasive technology should retain their interest without penalising them to help them get back on track quickly during their break from performing the behaviour (iv) social implications, i.e. knowing, appreciating, and designing for a wide variety of social circumstances are critical to the success of an everyday behaviour change technology and (v) social networks, i.e. encouraging activity through social networks is a sharp two-edged sword. While friends and family's social support can be a powerful motivator to change behaviour, it can also lead to backsliding toward old habits. Although Wendel (2020) argued that three phases must be considered in order to design for behavioural change: (i) ensure the satisfaction of users with the product, ii) a detailed understanding of the habits of users in order to impact them, and iii) on going product testing. Three elements need to interact to optimise the potential for behaviour change to happen: (i) capacity (e.g. Specifying targets, tracking, feedback and clear strategy), ii) opportunity (e.g. rewards), and iii) motivation (Michie et al., 2011).

2.7.4 E-HEALTH TECHNOLOGY AND DIGITAL ADDICTION

Most of the latest DA research has been performed from a social science perspective (Ryan et al., 2014, Hou et al., 2019). Examples of the studies include SZ et al. (2011) and Çam and Isbulan (2012). Many DA studies have focused on creating measurement scales for social networking sites addiction, e.g. (Andreassen et al., 2012, Hong et al., 2014, Sahin, 2018). In software design practises, this indicates that further research is needed (Requirements Engineering and HCI).

Hou et al. (2019) designed and tested the efficacy of an intervention in decreasing social media addiction and its possible adverse outcomes. The authors integrated cognitive reconstruction, reminder cards, and the diary approach in a unique intervention programme. Their findings showed that the intervention was productive in reducing students' addiction to social media and enhancing their mental well-being and academic effectiveness. As a result, this study employs a video-based intervention to educate viewers about the danger, their vulnerability to it, and ways to manage it in the context of Internet' addiction' (a life-threatening condition), as well as to shift their attitudes toward limiting their Internet use.

Precisely, it looks at the effectiveness of one preventive strategy, i.e. instructional clips, in minimizing and probably averting problematic inappropriate Internet usage. As a result, this study employs a video-based intervention to educate viewers about the danger, their vulnerability to it,

and ways to manage it in the context of Internet addiction (a serious threatening condition), as well as change their attitudes toward minimising their Internet use. The findings showed that the clips were effective in enhancing viewers' attitudes toward decreasing their internet usage, after controlling for users attitudes, degree of Internet' addiction, age, gender, and social desirability bias (Turel et al., 2015).

The authors Ko et al. (2015b) surveyed 41 mobile intervention applications designed to assist individuals monitor mobile phone use. The intervention apps were categorised into four categories: (i) smartphone addiction diagnosing, (ii) overuse intervention, (iii) children use monitoring and (iv) task distraction elimination. The apps employed various persuasive strategies, e.g. tracking usage, self-monitoring and apps locking functions .Ko et al. (2015b), suggested a method for limiting mobile phone use by enhancing "self-regulation" centered on social cognitive theory (i.e. social comparison and surveillance). The method (i.e. the system) comprises various parts, e.g. self-tracking, target-setting, social education, and competition. There is growing research interest to combat social media addiction using self-regulation systems, which underline addicts' agency in behaviour change. Persuasive messages and interactive alerts labels, as suggested in (Ali et al., 2015), can aid start and sustain that modification.

2.7.5 TECHNOLOGY-ASSISTED PERSUASIVE TECHNIQUES

Persuasive techniques are described as interactive technology for modifying the attitudes or behaviours of users (Fogg, 2009a) are meant for behavioural change interventions. The core concepts in persuasive systems are key task support, dialogue assisted system legitimacy, and social support (Torning and Oinas-Kukkonen, 2009). Persuasive technologies can assist alter the perceived rewards by implementing various ideas to improve the system's quality and help system users through the behavioural change process. These principles are summed up in (Torning and Oinas-Kukkonen, 2009).

2.7.6 CAPTOLOGY

Captology is a research field that concentrate on researching "computers as persuasive technologies" (Fogg, 1998). According to (Shahrom et al., 2014), Captology is also a technique that can help us think clearly about the target behaviours when using computing devices and their technologies. It aims to influence people's behaviours and attitudes by stimulating change with the help of interactive technologies. As presented in Figure 9, shaded area where computers technology and persuasion overlap define Captology. The area of Captology and Persuasive Technology is rapidly expanding. This is due to increasing computers' products and the augmented reality of mobile devices and wearable devices, including Fitbit Flex, GPS tracker systems, and smartwatch, designed to change what individuals think and do daily. The persuasion is described as effort to form, reinforce, or alter people's feelings, thoughts, or behaviours about

a subject, object, or action (Fogg, 1998). Different fields have employed the concept of captology such as HCI, education, health promotion and advertising (Fogg, 2009b). In addition to enriching HCI's theory of how humans communicate with computers, an understanding of captology will also lead to better design of interactive technologies especially those that convince individuals to regulate their behaviour in useful ways.

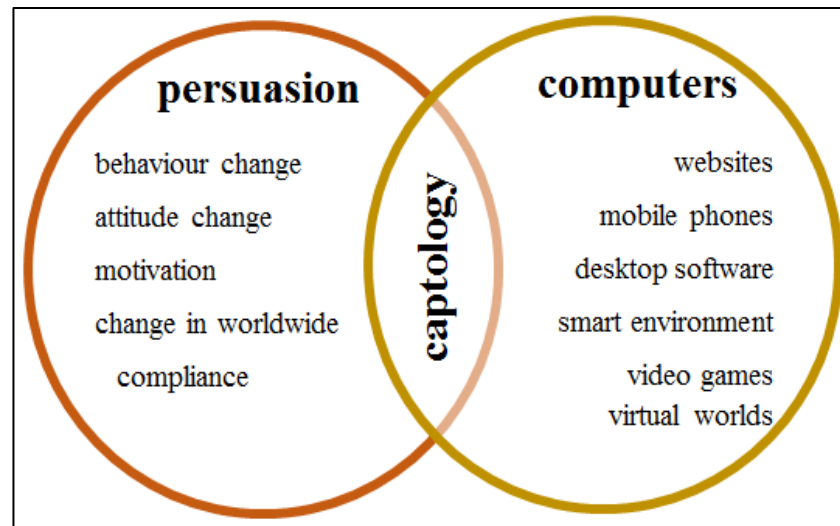


FIGURE 9: CAPTOLOGY (FOGG, 1998)

2.7.7 GAMIFICATION

Behavioural change can also be brought about by applying persuasive techniques. In this scenario, persuasive techniques involve interactive technology (Ko et al., 2015a). The main elements of persuasive systems are dialogue support, social support, key task support and system credibility (Torning and Oinas-Kukkonen, 2009). Furthermore, Torning and Oinas-Kukkonen (2009) explain that these technologies may amend the supposed benefits.

Gamification defines as the application of game design elements to non-gaming situations to either deliver greater productivity or improve the user experience. Apps designed for this purpose are referred to as gamified apps (Deterding et al., 2011). More specifically, gamification is the practice of using game-thinking to encourage people to resolve issues, and it makes full use of actively engaging the user. Furthermore, the degree of engagement can be measured in duration, frequency, ratings, recency and vitality. For gamification to be successful, the system designer must have a good appreciation of what motivates the players. Three factors that are often associated with successful engagement are ability, difficulty and variable rewards. Furthermore, engagement will be improved if the design process considers the player type (i.e. explorer, achiever, socialiser) (Zichermann and Cunningham, 2011).

2.8 PEER GROUPS

Peer groups enable likeminded people to come together for mutual support or motivation. (Davidson et al., 2006) defined mutual support as a “process by which persons voluntarily come together to help each other address common problems or shared concerns”. Hepworth et al. (2009) subdivided peer groups into two categories, i.e. task and treatment groups. Treatment groups adopt an open style of communication with a high frequency of self-disclosure discussions. The process of interaction helps shape the roles of the different group members. Treatment groups can adopt either fixable or formal, and progress is measured to achieve the stated treatment goals.

In contrast, task groups are associated with relatively low self-disclosure levels and adopt a structured communication style. The members of task groups often have roles assigned, and the procedural approach is considerably more formal. Furthermore, achievements are measured in terms of whether or not tasks are accomplished. Specific steps can be taken to enhance peer groups’ effectiveness, including addressing aspects such as patterns of interaction, group homogeneity, goal-setting, group dynamics, and sustainability.

Moreover, several theoretical frameworks can further develop our appreciation of the processes operating within peer group settings. The theoretical frameworks are self-psychology, cognitive consistency, social Psychology helper therapy principle, social learning therapy and group psychotherapy. Self-psychology explains various concepts, including the role of helping others enhance identity, interpersonal conflict in social contexts, and how values are weighted according to a given context (Kaplan, 2013). The cognitive consistency theory refers to the belief that behavioural change can bring about a change in attitude. Cognitive consistency theory is related to balance theory, self-perception theory and cognitive dissonance. Also, it emphasises the importance of assisting other people address behavioural ambivalence (Petri and Govern, 2012).

Social Psychology: this asserts that the people assisting also benefit from a dedication to behavioural maintenance; i.e. persuading others results in self-persuasion (Riessman, 1965). An example of this would be a recovered gambling addict using social media to help others while simultaneously advocating the benefits of their new-found lifestyle and showing that they have not relapsed. Social learning therapy is the process of behavioural change that can be speeded up by specific observational learning processes such as role-taking and copying (Bandura, 1997). Group psychotherapy, when delivered in small groups, can engender certain factors that benefit the process such as altruism, i.e. helping others benefits one’s self-esteem and the healing process, universality, i.e. appreciating that others face the same issues that you do and the instillation of hope, i.e. increasing expectations of help and benefit treatment outcomes and is often achieved when observing people at various stages of the rehabilitation process) (Yalom and Leszcz, 2020).

2.8.1 PEER GROUPS INTERACTION STYLES

There are two ways people can engage with each other face-to-face (Toseland and Rivas, 2013). The first of these is 'leader-centred'. There are numerous interaction patterns: maypole whereby moderators observe and award prizes and issue penalties; round-robin whereby members take it in turns to act as a facilitator; and hot seat whereby the moderator engages solely with one person, and the others observe. The second type is 'free-floating' in which the moderator roles are assigned across all of the members. In online peer groups, both modalities are possible to facilitate. It is also always possible to swap between according to the group's dynamics, e.g. when some members join or leave. This requires an in-advance setting and agreement to avoid a detrimental effect on the group coherence and sense of fairness.

2.8.2 ADVANTAGES OF PEER GROUPS FOR ADDICTIVE BEHAVIOURS

Peer group strategies have been found to encourage long-term change when applied during recovery programmes. However, it should not be considered that peer group settings offer a panacea that can replace therapists' role (Davidson et al., 2006). Instead, peer groups are most effective when deployed in conjunction with professional treatment. In particular, peer groups have been instrumental in supporting the pre-treatment stage by helping people realise that they have a problem. This is relevant to the transition from the pre-contemplation stage to the contemplation stage per the transtheoretical model (TTM) developed by Prochaska and Velicer (1997).

Addicts that are placed in peer groups before receiving professional treatment has been shown to decrease the length of the initial treatment episodes and enhance recovery rates. Moreover, being peer group member reduces the likelihood that further treatment will be required in future (Moos and Moos, 2004). Significantly, continued participation in peer groups is associated with a significantly reduced likelihood of experiencing a relapse (Moos and Moos, 2005). Assigning addicts to peer groups also benefits many persuasive and motivational mechanisms including consistency, social proof, commitment and reciprocity (Cialdini, 2009). This is important because it implies that when addicts help others deal with their addictions; this has positive effects on the addict.

2.8.3 ONLINE SUPPORT GROUPS

Social software can be used to enable online peer groups. This process often relies on surveillance to impose social pressure (Fogg, 2009a) to help deliver the desired behaviour (Alrobai et al., 2016b, Davidson et al., 2006). Online peer groups for DA can be designed in such a way that they combine attributes of task groups and treatment groups.

There are several ways in which online peer groups differ from in person peer groups. Online peer groups typically occur in relatively unrestricted environments, which encourage the participants to volunteer greater disclosure (Al-Deen and Hendricks, 2011). The ability to form

peer groups online is especially beneficial when operating in remote settings where it may not be feasible for the participants to travel to meet face-to-face.

However, while online peer groups undoubtedly offer advantages in intelligent interventions, persuasive experiences, and advanced gamification, (Alrobai et al., 2016b) states that they are also associated with adverse side-effects. For instance, online peer groups are believed to be more likely to spread negative emotions, justify negative behaviours, and mislead peer comparisons.

There are numerous unanswered questions regarding the implementation of the motivation method. Some of these relate to inadequate measures for determining the stage of change that each member belongs to. In addition, there are questions regarding the attributes (experience, recovery status, personality characteristics, and demographic profile) that the system should bear in mind when choosing moderators. It is also possible that different group configurations could require different attributes. For instance, moderate goals may help to encourage those who are in the transition stage, but those same goals may be inappropriate for a group of former addicts.

It can also be particularly challenging to observe all of the communications during face-to-face peer group discussions. However, with practice, moderators can learn how to recognise and interpret non-verbal signals (Toseland and Rivas, 2013). In contrast, online peer groups can utilise feedback mechanisms and monitoring software to capture all communications.

The patterns of peer group interaction styles such as free-floating and hot seat must be modified before they can be deployed for online peer groups. The interactions in these systems can be addressed from two distinct dimensions. First, interactions associated with addiction, such as providing a reward when the length of time spent browsing the Internet, are reduced. Therefore, the system employed should monitor how and when each individual engages with their SNS accounts. Secondly, interactions between the peer groups members can relate to the outcome of adhering or violating the group norms, such as imposing a penalty like a time-out on someone who utilised the phone more than agreed for a DA related group. This is related to the hot seat interaction pattern and is most applicable to the second dimension. Meanwhile, free-floating is likely to encourage more significant social interaction. However, while this could encourage positive behavioural change, some peer group members could potentially find this means of communication addictive.

From what has been gleaned from the literature review, it can be stated that the practices currently employed do not adhere to systematic rules regarding the structuring of peer groups and how interaction takes place. Indeed, many of these elements are seemingly handled in an ad-hoc fashion. This thesis does not promise to provide such a systematic approach but rather a consensus-based approach. The setting and the interactions are discussed and agreed in advance

to increase acceptance and adherence. The research notes that heuristics of what may be beneficial and detrimental will be made available to the groups to avoid adverse and harmful choices.

2.8.4 GROUP DEVELOPMENT

Group development concerns the transition of small groups over time. Several theories and models have been suggested to clarify various elements of the development of small groups. Such examples are Fisher's theory (1970), the TIP theory (McGrath, 1991), and the Tuckman's model (1977). According to research, teams go through distinct stages during development. (Tuckman, 1965), defined a four phases method of development that most teams employ to become high performers, these stages are forming, storming, norming and performing. Tuckman later introduced a fifth stage called adjourning. Figure (10) below depicts these stages.

Forming can be described as the development of common goals, similarities and objectives to establish connection and belief. Storming refers to recognising problems of power and influence, voicing differences and appreciating them. Norming can be described the creation of universal laws, responsibilities, community culture, and processes for problem-solving. Performing refers to accomplishing preferred outcomes via teamwork, respect, care and proper regulation. Adjourning refers to when projects end or permanent teams are dissolved, and individuals are redeployed.

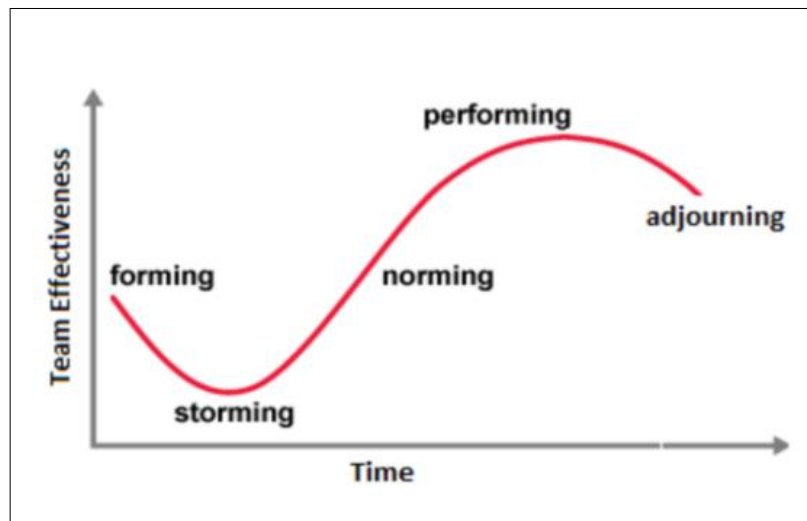


FIGURE 10: STAGES OF GROUP DEVELOPMENT (Tuckman, 1977)

2.8.5 GROUP THERAPY

Group therapy is currently employed to treat various disorders such as Obsessive-Compulsive Disorder, Social Anxiety Disorder and Panic Disorder. The group therapy is standardised, implemented quickly, and takes less time for the therapist than individual behavioural therapy (Himle et al., 2001). Two types of treatment groups are available: closed-ended and open-ended groups (Abrams et al., 2004, Roth and Covi, 1984, Asimos and Rosen, 1978). Closed groups have

an exact start and end times and shall function in compliance with a specific pre-determined series of care modules. Some of these modules are designed to offer an essential knowledge of a specific diagnosis or clinical issues, while others concentrate on improving managing mechanisms or techniques for CBT. In open groups, participants will be assisted during each group meeting to establish a particular behavioural goal to be accomplished throughout the session. In group therapy sessions, patients are provided with (i) education about the disorder, and its treatment, (ii) instruction in a cognitive and behavioural approach to the self-treatment of the disorder and (iii) guided behavioural planning and treatment (Krone et al., 1991, Himle et al., 2001).

2.8.6 GROUP DYNAMICS

Zander (1960) define group dynamics as an area of research devoted to learning more about the existence of groups, their creation rules, and how they interact with individuals, other groups, and larger organisations. Meanwhile, Forsyth (2018) offers a more succinct definition: a group is (a) two or more people (b) who sway each other (c) through social contact.

How a peer group functions can be influenced by various dimensions of the group dynamic, including the group's size, group cohesion, goal-setting, interaction patterns, social integration, and group culture. To be made with treatment programmes, it is necessary to truly understand group dynamics and their impact on online peer groups. This is important because what has been shown to work well in in person peer groups may be ineffective in an online setting. For instance, the free-floating approach, whereby the group members share the moderators' roles, may be unworkable. Therefore, new forms of addictive processes, behaviours and tools could all affect how the group performs. It may be necessary to adopt specific decision-making processes in the groups whereby the therapist or some other non-addict is invited to decide whether the interactions that have been suggested should be adopted.

Face-to-face peer groups can use either open-ended or closed-ended frameworks (Schopler and Galinsky, 1990a). The Centre for Psychological and Behavioural Science in Florida (Centre for Psychological Behavioural Science, 2015) used closed-ended groups for sequential process treatment for newcomers to the treatment process or for those who expressed a desire to receive peer support from those with similar goals. However, open-ended groups were also utilised throughout the entire treatment process. In this particular process, individuals are evaluated before participation. As the programme progresses, they are encouraged to choose appropriate goals and are then offered the support they need to achieve them. In this way, even new members can benefit from group engagement. Frameworks for online peer groups regulating DA require further research to establish their effect on group dynamics (Schopler and Galinsky, 1990b). For instance, the conformity effect could cause certain individuals to temporarily alter their behaviour due to their desire to conform and avoid being penalised. Toseland and Rivas (2013) may interpret this as a positive development. However, it may only occur within the group setting to accelerate

progress towards the groups' goals. For a treatment group, this presents a distinct possibility of relapse.

Group configurations and their ability to influence group dynamics present a particular problem for online peer groups. The configuration may involve a group of people at various stages of the process (e.g. pre-contemplation and maintenance) according to the TTM (Prochaska et al., 2013). The group configuration can also present different structural potentials. For instance, the social structure of the group can be influenced by a variety of relationships. Fiske (1993) identifies four distinct types of relationships: equality matching (paired with an equal, e.g. a fellow student); communal sharing (e.g. a good friend with whom you gladly share everything); market pricing (a competitor such as a work colleague); and authority ranking (a person whom you respect).

Group configuration can also refer to the type of group. For instance, if a group enjoys a positive, friendly atmosphere in which members engage in fruitful discussions, increasing the number of people in this group could yield positive outcomes. Conversely, in a group in which surveillance and competition approaches are applied, increasing the size of the group is likely to have an adverse effect on performance and monitoring and maintenance efforts will probably prove challenging (e.g. imposing rules and reaching consensus) (Toseland and Rivas, 2013). Similarly, group size is likely to be an issue for online peer groups because further members could result in issues regarding group clustering.

2.9 DESIGN APPROACHES

Collecting user engagement data (e.g. behavioural insights and user comments) with digital technologies will help investigate DA and how online peer groups can control it. It is also vital to integrate a wider variety of user experience and provide a combination of data collection techniques that make it easier to access such information during the design time. User active engagement is necessary to accomplish this. Such engagement will also help increase the acceptance of online peer groups' design, as a trade-off with user experience could result in DA care. In this section, several methods that can assist to accomplish this and explain the relationship between human-computer interaction of the online peer groups and DA are introduced.

As online peer support groups are intensively human centred, it is essential to review and understand approaches such as participatory design and user-centred design for their potential adoption in the design process. One reason is that they differ from traditional approaches to software engineering and information system design in that they place a greater emphasis on fast prototyping, user preferences and system functionality over technical production and system performance (Sjöberg and Timpka 1998). Some of the techniques are iterative in nature and base information system design on the viewpoint of the end-user and their feedback and changing requirements. In terms of the behavioural change theories, there is a growing acknowledgment

that the creation and design of software-based interventions to change behaviour should incorporate theories of behaviour and behaviour modification and should be accepted by their users (Michie 2008). Theory offers a solid foundation for developing interventions to help change behaviour. Even a large body of literature on behaviour change interventions may be of little help in developing an intervention for a new scenario if it does not have a theoretical foundation (Foy et al. 2005). Interventions to modify health-related behaviours usually have minor impacts, but they might be more effective if they are based on sound theory (Davis et al. 2015). Drawing on a broader variety of theories that incorporate social, cultural, and economic aspects that influence behaviour may improve intervention efficacy (Davis et al. 2015). Also, the theories are reviewed to help understand their principles and how they can be included in behavioural change intervention design, e.g. online peer support group to assist the behavioural change process. Without this knowledge, designing software tools to aid behaviour change can be erratic. Hence, the thesis aims to provide a body of knowledge and guidance to software engineering community on what to consider when building and configuring such platforms to host peer support groups.

2.9.1 USER-CENTERED DESIGN (UCD)

User-centred design (UCD) is a technique to design a system for users that requires to involve users requirement during the design process, especially during requirements collection and usability testing (Abrams et al., 2004). UCD focuses on the relationship between human-computer interaction (HCI) and design practices in which satisfying users' needs depends on users becoming involved (Marcus and Wang, 2017).

Meanwhile, Lowdermilk (2013) noted that the purpose of user engagement is not merely to give a retail experience; instead, users should be led by the engagement process in order that their knowledge can be fully exploited. Failure to do so would be likely to result in significant mistakes being made. Abrams et al. (2004) have issued guidelines advising on how and when users should be involved in the design process:

- Users' needs and expectations can be gleaned from questionnaires and interviews at the start of the design process.
- To develop a greater appreciation of the work sequence, additional questionnaires and interviews are deployed in the design process's early stage.
- During the early design cycle, several focus groups and on-site observations are used to amass data regarding the environment in which the system is to be deployed.
- In the early-to-mid stage of the design cycle, role-playing and simulation are employed for evaluation purposes and acquire further information.
- In the final stage, interviews, usability testing and questionnaires are used to acquire qualitative and quantitative data to gauge usability and satisfaction.

2.9.2 PARTICIPATORY DESIGN (PD)

Participatory design (PD) is a form of user-centred design (UCD), the users are included in the development of the products, and users become co-designers (Abrams et al., 2004). According to Spinuzzi (2005), PD stresses that researchers and designers must come to conclusions in collaboration with users in order to review the implicit, unseen facets of humans and make certain that their meanings are considered. There are three stages in PD:

1. **Stage 1 Initial exploration of works:** in this stage, undertaking bottom-up examinations and stimulation in order to gain insight (e.g. observations, ethnography and organisational visits).
2. **Stage 2 Discovery processes:** in this stage, co-operative group engagement provides a deeper appreciation of the values, goals and desired outcomes so that they can be suitably prioritised. At this time, consideration should also be given to identifying concepts that govern how software constructs such as adaptivity and interfaces are designed.
3. **Stage 3 Prototyping:** in this stage, design artefacts are iteratively shaped with the aim of delivering proof of concept (i.e. concept prototyping). It can also address functional elements (i.e. functional prototyping). This approach to prototyping is effectively an engineering tool that can be employed to arrive to several goals such as gaining an appreciation of users' desires and operational context, gathering, improving and assessing needs, evaluating the appropriateness of design decisions, investigating design problems and encouraging progressive learning in the communication and development team.

PD stresses the importance of representing users' involvement in the design process. Provided that caution is exercised, the same method can be applied during the design process for intervention tools in future. There may be a conflict between representative users' values who engage in the design process and peoples' values (Kujala and Väänänen-Vainio-Mattila, 2009). Therefore, it is possible that the interest and engagement of real users could be jeopardised.

- Be that as it may, it is necessary to develop guidelines based on best practice to direct user involvement. This is especially important when dealing with addicts who may be in denial about their actual situation. Further research is required to utilise user-centred and participatory approaches when developing technology capable of regulating digital addiction. For instance, it remains uncertain whether former addicts should be involved in the design and testing processes or, indeed, in what way they could be used. Former addicts may well have empathy for the situation that addicts find themselves in. However, it is also distinctly possible that they will be biased and imposed their own opinions that have been formed as a result of their personal experience.

2.10 TECHNOLOGY ACCEPTANCE MODEL (TAM)

User acceptance of technology is a significant field to predict and explain the use of a system. Various models have been proposed to predict and accept or reject a system. The information system community consider the Technology Acceptance Model to be the most common research model for predicting the user's use and acceptance of technology. Davis (1985) introduced the Technology Acceptance Model (TAM) by adopting the Theory of Reasoned Action (TRA), which is one of the theories used to determine decide the individual's intention to behave in a certain way. As presented in Figure 11, TAM is employed to explain users motivation to accept new technologies and their intention. Several factors influence acceptance design: Perceived Usefulness (PU), Perceived Ease of Use (PEU) and Attitude regarding system use. Several factors influence acceptance design: Perceived Usefulness (PU), Perceived Ease of Use (PEU) and Attitude toward system use. Perceived usefulness is described as the extent to which a person feels it will increase their job efficiency by using a specific system. Perceive ease of use (EOU) the extent to which an individual feels that it would be effortless to use a specific system (Davis 1985). The author mentioned that perceived usefulness and ease of use were hypothesized to be directly impacted by the system design features, represented by X1, X2 and X3 in Figure 11.

The Technology Acceptance Model (TAM) was compared to the Theory of Reasoned Action (TRA), and as a result, a model was proposed based on three factors: perceived usefulness, perceived ease of use, and behaviour intention (Davis et al., 1989). The researchers have discovered that social norms (SN) are an essential factor in determining behaviour intention to be weak.

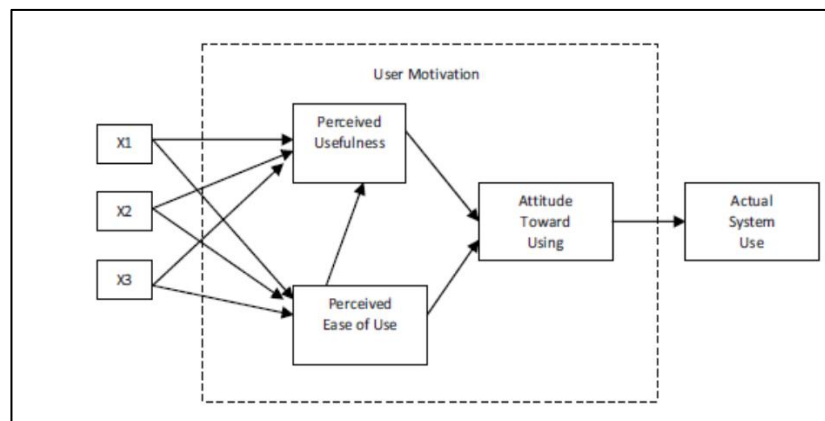


FIGURE 11: TECHNOLOGY ACCEPTANCE MODEL (DAVIS ET AL., 1989)

2.11 CONSENSUS BUILDING

Consensus building (also known as collaborative problem solving or collaboration) is a commonly used method for making decisions and resolving conflict problems. The process allows numerous stakeholders interested in collaborating to develop acceptable solutions (Moghaddam et al., 2011). Stakeholders are commonly used for consensus building to search for suitable approaches for dealing with ambiguous, difficult and debatable planning and policy tasks.

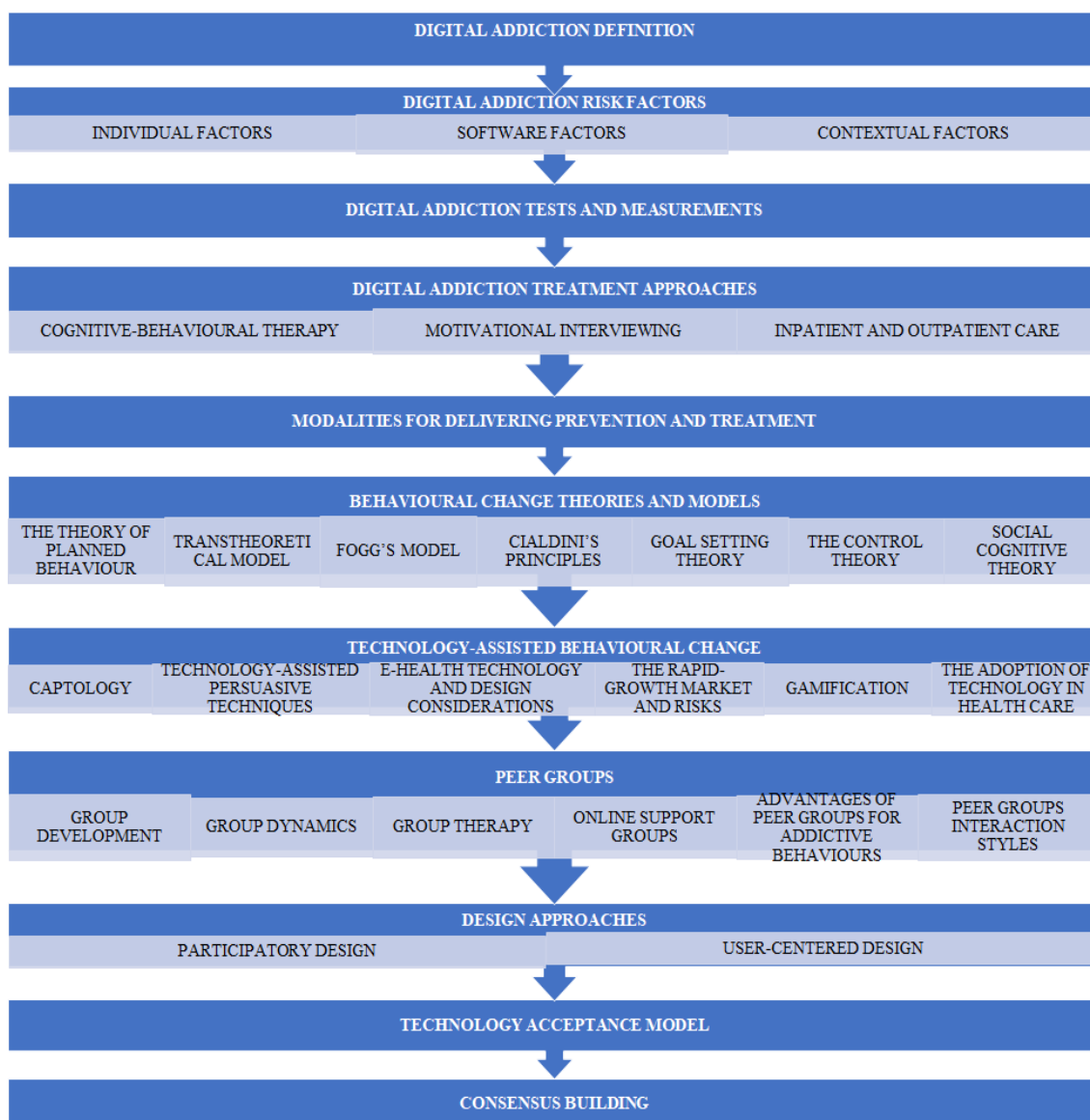
Commons-based peer production (Benkler, 2006) can support the consensus building process in two ways. The first way employs all available human and technical capacity to resolve the problem; for instance, there is a preference for collective approaches among online communities. The second way sees successful consensus building achieved by motivating participants to provide perceived positive signals and reassuring them that their contribution has improved the product. When consensus building, stakeholders have different interests, and they meet face-to-face for a long-term conversation about process a policy topic of combined concern. Usually, they have a moderator, and they create the experience of a mediated conflict decision. Grünbacher and Hofer (2002) studied negotiation and consensus building. They proposed a negotiation process called EasyWinWin, which defines a set of guidance activities to the stakeholders in the negotiation process such as brainstorming stakeholders' interests, prioritising win conditions and revealing issues and constraints.

Consensus building is needed for achieving an agreeable design of peer groups. It is noted here that consensus does not mean identical view but rather an agreement on commonality and diversity. For example, group members can agree that setting collective goals shall be done either by the moderator or through voting. In contrast, individuals shall be free in setting their individual goals and be in charge of monitoring them and possibly sharing the results with others.

2.12 CHAPTER SUMMARY

The state of the art concerning DA was analysed in this chapter, and the use of online peer groups as a motivational tool was discussed. This chapter also discussed some of the approaches that could be used to direct the creation of tools, processes, and structures to construct digital use-regulating systems, Table 4 shows the topics discussed in this chapter. The thesis methodology, and choices for attaining the research objectives will be presented in the next chapter.

TABLE 4: LITERATURE REVIEW CONTEXT AND FOCUS



3. CHAPTER 3 METHODOLOGY

In this chapter, an introduction to the thesis methodology, which involves discussing research philosophy and approaches, is provided. The chapter will further delve into the research strategies, their designs, the research options, and the time horizon, including the subsequent stages of the research procedure regarding the method of data collection and finally, the analysis of the research and interpretation of the data gathered.

The main structure of this chapter will be based on Saunders’ framework (2009), as indicated in Figure12 of the research onion. This illustration will be applied to elucidate the diverse stages of the research process, including the research philosophy, strategies, approaches, methods, and techniques that will follow in order to accomplish the desired research objectives. The underline components in the diagram are the research methodologies that will be implemented and analysed in the succeeding sections.

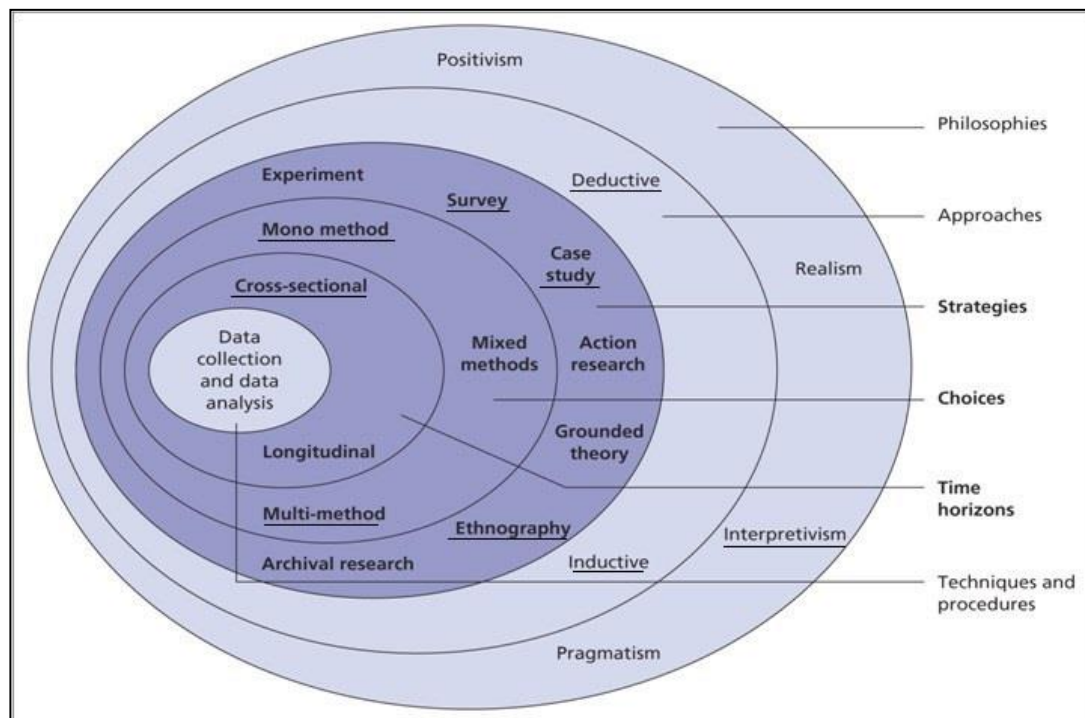


FIGURE 12: RESEARCH ONION (SAUNDERS ET AL., 2009)

3.1 RESEARCH PHILOSOPHIES

This section will analyse the four main philosophical paradigms which may offer clarity and guidelines to conduct the research proceedings based on pragmatism, positivism, realism and interpretivism. The philosophy involved in the research could be analysed on the assumptions of the researcher’s perception of the world. Taking this view into consideration, one can argue that some researchers are solely concerned about interpreting facts rather than focussing on the subjective analysis about feelings and attitudes of the research involved. On the contrary,

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researchers may have their options and differ in implementing its approaches rather than subjecting their research analysis based on attitudes and feelings (Saunders et al., 2009). To sum up, the objective of the research is not only to confirm that the study has followed the right and well-informed research philosophy but also to validate and affirm the reason for upholding the specific philosophical choices in relation to the other alternatives available (Saunders et al., 2009, Johnson and Clark, 2006). A summary of the primary research philosophies and their associated data gathering methods and procedures is illustrated in Table 5.

TABLE 5: RESEARCH PHILOSOPHIES AND ASSOCIATED DATA COLLECTION (SAUNDERS ET AL., 2009)

	Pragmatism	Positivism	Realism	Interpretivism
Data Collection Methods	Mixed or multiple Methods: Quantitative and qualitative	Large samples mainly based on Quantitative Structured processes; may also involve qualitative method.	The methods should match the objective of the topic or the combination of both Quantitative or qualitative	Minor samples, in-depth to investigate Different qualitative methods.

3.1.1 PRAGMATISM

Pragmatics “recognise that there are many different ways of interpreting the world and undertaking research, that no single point of view can ever give the entire picture and that there may be multiple realities” (Saunders et al., 2009). Hence, adopting the pragmatist philosophical paradigm requires researchers to decide on their inquiry methods according to their research questions. Research usually following the pragmatist paradigm typically embraces several approaches, including quantitative, qualitative, and action research (Wilson, 2014). Both interpretivist and positivist perspectives may both be integrated into it (Saunders et al., 2009).

3.1.2 POSITIVISM

According to positivism, that which researchers can observe, and measure is science. Social phenomena can be studied using the same methods as might be used for natural phenomena. Data should be analysed in a value freeway and the phenomenon described as experienced (Krauss, 2005). In this way, the use of standard methods can see the same findings arrived at by different studies (Hair et al., 2015). Unlike other paradigms, whose researchers need to participate in the world they study to understand its properties, positivism does not require that its practitioners do so (Saunders et al., 2009).

3.1.3 REALISM

Realists see reality as objective and independent of the mind that perceives it. Realism is “the view that entities exist independently of being perceived, or independently of our theories about them”(Phillips, 1987). It considers every aspect of the universe the human senses can perceive as influencing the phenomenon under investigation (Maxwell, 2012). In direct realism, a scientific approach is therefore needed to acquire knowledge (Saunders et al., 2009), while critical realism is a little different in that it falls into two stages. Researchers are encouraged to look at experiences and phenomena as merely the reality’s entities and characteristics in the first stage. In the second stage, those experiences and phenomena are further examined to grasp the reality behind them (Saunders et al., 2009).

3.1.4 INTERPRETIVISM (INTERPRETIVIST)

The prime objective of interpretivism or interpretivist is to integrate people’s interest and opinion in a study that entails participants’ views, interests and ideas to delve into the subject matter under research.(Creswell and Creswell, 2017). “interpretive researchers assume that access to reality (given or socially constructed) is only through social constructions such as language, consciousness, shared meanings, and instruments” (Myers, 2019). The philosophy of interpretive affirms the significance of Qualitative analysis over quantitative. They mainly deal with diverse aspects of social issues involving qualitative techniques for example observations and interviews, including open-ended questions to maximise peoples’ participation to manifest their ideas and experiences to generate data to regulate the field of investigation. The secondary sources of data collection assumed to be another popular technique involved in this ideology.

Before deciding which research, philosophy is relevant for this thesis, the data gathering procedures linked with the philosophies mentioned above were considered. This information is indicated in Table 5. After taking into account each research philosophies’ implications throughout this section, the research decided to choose the pragmatist philosophical paradigm. The reason to corroborate pragmatism as a relevant strategy for the optimum ramification of the research issue under analysis while not fully inclining to the theory of positivism and interpretivism as a rigid system of assumptions and beliefs (Cohen et al., 2002). Nonetheless, the main objective of this thesis is to examine the strengths and limitations based on the design of online peer groups. The pragmatist theory is highly justifiable as it focuses on human experiences as a reasonable means to evaluate the strengths and limitations of the research undertaken. Additionally, both quantitative (i.e., survey) and qualitative (focus groups, interview, and co-design session) data gathering initiatives were deemed vital in order to gain useful insight into the research investigation; hence, the pragmatist philosophy assumed to be reasonable for the research objectives.

3.2 RESEARCH APPROACHES

A research approach summarizes the broad conceptual framework a researcher deems necessary to organize the research activities for clarity and coherence systematically. There are two main research approaches, such as deductive and inductive methods. The functions of these methods are clearly illustrated in Figure 13.

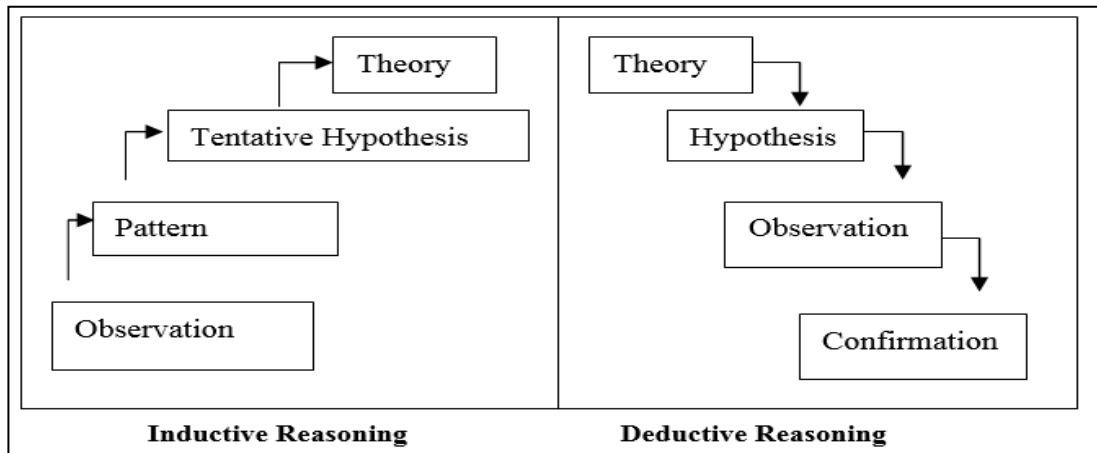


FIGURE 13: DEDUCTIVE AND INDUCTIVE RESEARCH APPROACHES (Aliyu, 2015)

As indicated in Figure 13, the deductive approach is “top-down” while the inductive approach is “bottom-up”. The theory generation and hypothesis formation phases of deductive approach is accompanied by gathering of empirical observations which depend on sampling in order to generate credible outcome based on enough large sample size (Saunders et al., 2009). Consequently, the accumulated data is analysed to corroborate or not accept the hypothesis, which has implications in the initial theory. On the contrary, the inductive approach partly repudiates the deductive process; it initiates the preceding with observation, followed by interrogation and subsequently analysis of the data accumulated through observations (i.e., to discern a pattern), and finally forming a new hypothesis and theory, which may be tested using the deductive approach. Hence, the deductive approach moves from the specific to the general, whereas the inductive approach moves from the general to the specific. However, it is notable that inductive approach is highly applicable to gain access for investigating complex behavioural and social issues; furthermore, inductive reasoning is valuable strategy that exemplifies any informal association between people without expounding the social world surrounding them (Thomas et al., 2015). Taking the significance of inductive approach into consideration, the researcher determined to adhere to the structural flexibility of the attempted thesis.

The prime objective of the research is to investigate upon the acceptance and rejection factors necessary to join the online peer group; concurrently it seeks to relate the prerequisite for various designs preferable for online peer group to engage and subsist the complicated online behaviour.

3.3 RESEARCH STRATEGY

The research strategies may be explanatory, exploratory, or descriptive, they are deemed necessary for guiding the formation of an overall plan by which the research question and its goal could be tackled (Saunders et al., 2009). Some approaches are the natural equivalents of deductive approach and a certain philosophy (e.g., the positivist philosophy), whereas others are intently linked with the inductive approach and different kinds of philosophy (e.g., the interpretivist paradigm). Particular research approaches incorporate ethnography, action research, grounded theory involving the case study (Saunders et al., 2009). The main concern of a researcher is to ascertain about the preference of one strategy over another or whether several strategies should be delved into. The ultimate outcome of the research relies on the subject and the overall objectives of research exploration (Saunders et al., 2009).

3.3.1 ETHNOGRAPHY

Ethnography is a systematic study of individual culture to enable researchers to learn and collect in-depth qualitative information about people common variables in their own surroundings by adopting approaches for example participant observation and face-to-face interviewing. “As such, it does not have control over the field settings.” It employs both inductive and deductive approaches (Saunders et al., 2009).

The advantage of ethnography provide flexibility to the research by help the researcher to identify and discover patterns in people behaviours involves the elements they may be unsure and hesitant to reveal. Also, it may inform the next research stages, e.g. interviews and surveys (Lazar et al., 2017).

There are some challenges linked with research concerning ethnography. This approach assumed to be a time consuming as it demands extensive involvement in the social context under investigation; It may sporadically lead to subjective outcome of the data accumulated often lacking validity and precision. However, the researchers may take recourse to multiple sources of evidence through repeated observation involving qualitative methods such as interviews; these sources, can be utilised to form a comprehensive understanding of the research undertaken by minimise the bias factors involved and reflect accuracy in interpreting peoples’ experiences and opinions in their social milieu.

3.3.2 EXPERIMENTS

Method of experiment is used to study the causal relation among a dependent variable and a set of independent variables, the experiment technique can be adopted (Saunders et al., 2009). Consequently the deductive method is often exercised in natural and social sciences inclusive of

practical and theoretical focus on the research to signify the relevance of “how” and “why” questions.

3.3.3 SURVEYS

The technique of Survey is widely utilized in the study of social sciences, more particularly in business and management research. The popularity of this method is based on the fact that it is cost-effective and time-efficient for accumulating huge amount of data for analysis (e.g., applying inferential and descriptive statistical methods) these procedures assist the researchers to represent and hypothesize a particular segment of population under survey (Saunders et al., 2009). The survey method with its leverages and drawbacks as the strategy to rely entirely on its strengths may not be definitive as a primary source of data collection. (e.g., a questionnaire), the process of data gathering based on questionnaire may lack accuracy and validity of the samples gathered. The observational approaches and structured interviews can also be applied as a part of a survey approach (Saunders et al., 2009).

3.3.4 CASE STUDY

According to Lancaster (2007), the aim of the case study approach is to extract evidence that highlights a particular phenomenon in the context of the world as it is. Case studies can lead to contextualised results (Morris and Wood, 1991). Case studies may be exploratory or explanatory (Saunders et al., 2009) and researchers have the choice of many ways of collecting data including focus groups, questionnaires and interviews. Effectively designed, case studies can be a way of testing theories and examining innovative research questions. Yin (2012) advises that a common reason for choosing case studies is to evaluate real-world research. When used in combination with other research strategies rather than in isolation, they can help both in evaluation and in identifying significant findings.

3.3.5 GROUNDING THEORY

Grounded theory includes the gathering, analysis and coding of data to legitimize qualitative research. “grounded theory is used to develop theories that are rooted in data gathering and analysis, and which can be leveraged to account for human behaviours” (Strauss and Corbin, 1997). The data collection methodology corresponding to grounded theory is primarily qualitative approach comprising of questionnaires, focus groups, diaries, and interviews. Saunders et al. (2009) it has been noted that the data collection process can be initiated in the strategy of grounded theory without forming a theoretical framework. Charmaz (2006) mentioned that grounded theory is directed towards the analysis of social relations. The relationship between individual social process is the main focus of social psychology (e.g., personal experience, prejudice, interpersonal conflict, and motivation).

Grounded theory is a principal research strategy that will be applied to steer the proposed thesis as it is the prime focus to inductive approach including a valuable tool for addressing the focal points of the study under investigation (i.e., the concepts of peer pressure, moderator, gamification etc.). Moreover, the flexibility of the thesis, inclusive of its question-driven nature is consistent with the ratification of grounded theory.

3.3.6 ACTION RESEARCH

Action research as described by Coghlan (2019) is a process in which both an problem and the implications of the resolution actions are explored simultaneously. The democratic and collaborative involvement of practitioners and researchers in the research process is the key characteristic of action research (Saunders et al., 2009). In this way, the feature that distinguishes action research from other research strategies is its focus on actions in a specific context (e.g., a corporate setting), which means the strategy is suitable for addressing “how” questions. In terms of the advantages associated with the selection of this strategy, Saunders et al. (2009) drew attention to its focus on changes, particularly in terms of the strategies to recognize the factors in detail that time must be allocated for diagnosis, planning, implementation, and evaluation of changes; while reflecting upon these factors, action research demonstrates significant value in the business and management literature.

3.4 RESEARCH CHOICES

The researcher determines research project choices by deciding to use non-statistical qualitative data, statistical quantitative data, or both (Saunders et al., 2009). The research questions will be the ultimate decide whether to use both data types, analysing them in a variety of ways, or whether only one is best in this case. So it is that, according to Saunders et al. (2009), researchers have a number of choices to make: (i) mono method, involving one form of data collection and analysis (statistical data and quantitative analysis, or non-statistical data with qualitative analysis); (ii) mixed methods, combining in parallel or sequentially both quantitative and qualitative data collection and analysis; and (iii) multi-method, using a number of data collection and analysis methods.

Mixed methods were the approach chosen for this thesis, using both quantitative and qualitative data gathering methods and modes of analysis (in Chapters 4 and 5, and Chapters 6 and 7). The benefit from this choice is the opportunity it offers for data triangulation, where linking the findings of the two stages of research make more robust conclusions possible. Also, using mixed methods design in this thesis an able the researcher to have insight into the core factors that affect a personal decision to join online peer groups and play an active role and also to explore explores the variability space of these designs to accommodate different users’ preferences.

3.5 TIME HORIZONS

Saunders et al. (2009) describes time horizons as a way to deal with the properties of the problem under investigation. Some research studies a process over time to capture a problem's dynamics. Human development is an obvious example. Where the properties being investigated are stable so that changes are not immediately apparent, the researcher can use a cross-sectional or longitudinal time horizon (Saunders et al., 2009):

- **Cross-sectional:** when it is possible to obtain the answers to a problem at a specific time.
- **Longitudinal:** when it is possible to obtain the answers to a problem only over a period of time (a “diary perspective”) (Saunders et al., 2009).

Selected time horizon perspectives are independent of research strategies, though a combination of survey strategy and cross-sectional time perspective is not uncommon (Easterby-Smith et al., 2012).

Because no interventions are applied to user experience in this thesis, it does not aim to collect changes in users' perceptions and attitudinal responses. All answers to the research questions are obtainable at one particular time, and so this research uses the cross-sectional time horizon. The longitudinal research was not used since answering the study question did not need exploring how the target factors change over time (Saunders et al., 2009).

3.6 DATA COLLECTION AND DATA ANALYSIS METHODS

Data collection and its analysis is the core component of the research onion. The study's methods and procedures have considered different approaches and process of analysis employed for recruiting participants, determine sample sizes, gather data in order to reduce bias and increase reliability, transferability, or generalisability to facilitate analysed data to gains insight into the information gathered for research analysis. The succeeding section explores and justifies the various techniques of data gathering and analysis employed for the present thesis. A summary of the data gathering techniques employed in this thesis is indicated in Table 6, together with a description of the location of this document including the application and findings markedly explained in detail.

3.6.1 ADOPTED DATA COLLECTION METHODS

The thesis observes a bottom-up research approach to advance from the stages of data gathering leading to analysis and subsequently to the theoretical level. The next section will discuss the data gathering technique the research has maintained to attain its objectives. The discussion in this chapter will deal with the explanation of the technique, and the instructions of how it will be applied in order to accomplish the required outcome of the study under analysis.

TABLE 6: RESEARCH METHODS SUMMARY

Reviewed Data Collection Methods	Characteristic	Used Data Collection Methods
Interview	Qualitative	Chapters 4 and 5
Focus group	Qualitative	Chapter 8
Survey	Quantitative	Chapters 6 and 7
Observation	Qualitative	Chapter 8

3.6.1.1 OBSERVATION

Observation is a systematic manner of observing and recording descriptive notes, analysis and interpretations of the behaviour of people and groups (Saunders et al., 2009) and fall into two types:

- **Participant observation:** a qualitative method to finding what peoples' actions mean, involving immersion by the researcher in the research environment as an active group member participating in group activities. According to Gill and Johnson (2002), four roles can be used:
 - **Complete participant:** the researcher participates as a member of the group which does not know why the researcher does so.
 - **Complete observer:** as with the complete participant, the group has no idea why the complete observer is involved with it. In this case, however, the researcher is not a participant in group activities.
 - **Observer as a participant:** group members know that the researchers are researching and researchers take no part in group activities. The researcher focuses only on research, and can discuss it with group members.
 - **Participant as an observer:** group members know that the researchers are researching, which builds member trust in researchers. Researcher may participate in group activities and can improve their understanding by asking questions.
- **Structured observation:** a quantitative approach examining how often people do things. The structure is fixed in advance, for example through. a list of behaviours and the contexts in which they occur.

In this thesis (chapter 8), the observation will be used as part of the process of evaluating the proposed materials to realise Objective 4. The first observation is made as part of the construction phase of the proposed materials itself which includes a trial for consensus building methods applied to achieve the final results. The observation in this case looks at bottlenecks, reconciliation mechanics and their suitability. Observations are also used in the focus groups to realise Objective 5. As such, observations will be applied when trailing the consensus building

techniques which may form part of the proposed materials and then when trailing the suggested proposed materials itself.

3.6.1.2 INTERVIEWS

The interview is a qualitative research method that can be very successful in collecting valid, reliable data to answer research questions (Saunders et al., 2009). Questions can be designed in the way most likely to meet the researcher's objective and it is important that interviews are consistent with the purpose of the research. Exploratory interviews may take place before the objectives of the research have been formulated. Interviews may fall into one of three main forms (Saunders et al., 2009):

- **Structured interviews** comprise pre-defined and standardised questions, which the researcher asks one-by-one in sequence. The researcher can then collate the answers.
- **Semi-structured interviews** comprise structured but also unstructured questions. Before the interview, the researcher prepares themes and questions but is able to ask additional questions that arise during the interview to obtain clarification to explore certain issues further. It is also possible to vary the order of questions for different interviewees. Health services researchers can employ semi-structured interviews to better understand people's attitudes, beliefs, and experiences (DeJonckheere and Vaughn 2019).
- **Unstructured interviews** have no pre-prepared questions, but the researcher must have a clear understanding of aspects to be covered. Researchers can talk freely with participants with no constraints on topics or questions.

Successful interviews collect data in a consistent fashion in connection to the research question, and they usually have a clear goal in mind. For an exploratory study, exploratory interviews, for example, may be undertaken to aid a researcher in determining the requirements of study, and the obstacles connected with these interviews are unique from those that try to answer pre-set research issues. In this study, all the interviews administered in Chapters 4 and 5 were semi-structured; consequently, it gives the researcher the opportunity to rectify the findings of the data collected for more exploration into other associated aspects. The key objectives of interviews, as outlined by (Lazar et al., 2017), have been implemented. In chapter 4 and 5 the interview was used to realise objective 1 in chapter 4 to understand objective 2 in chapter 5. Interviews are used to clarify design factors and the acceptance criteria people have in order to participate in peer groups. Because interviews require knowledge of the subject being studied, the researcher must utilise materials that provokes feedback and encourages speculation. This is significant, because the technique is in its developmental stage and there are not established models available for it in practice. The closest is group therapy which is mainly used to increase the speed and scale of the therapy from the perspective of a therapist by targeting a group rather than people individually. For this reason, the research generated mock designs and scenarios to assist the participants to

comprehend the topic for speculation about the potential conflicts and concerns regarding acceptance of online peer groups.

By adopting qualitative methodology, a prospective researcher is going to fine-tune the pre-conceived notions as well as extrapolate the thought process, analyzing and estimating the issues from an in-depth perspective. This could be carried out by one-to-one interviews or as issue-directed discussions (DeJonckheere and Vaughn, 2019).

3.6.1.3 FOCUS GROUPS

Focus groups allow the cost-effective collection of rich, diverse information from respondents in groups (Lazar et al., 2017). They are structured discussions among a sample group to obtain data about a research issue (Saunders et al., 2009). The researcher coordinates the discussion, keeping it within the intended boundaries, and gathers targeted information but does not lead or influence participants or affect their responses (Saunders et al., 2009). Focus group size will depend on availability of time and resources and also on the topic being researched, but will usually be between 4 and 12 participants (Saunders et al., 2009). Focus group limitations include the possibility that some participants will dominate proceedings, preventing other participants' ideas from being heard. During the early or exploratory stages of a study, focus groups might be employed (Kreuger 1988). The major goal of focus group research is to elicit responses from respondents' attitudes, feelings, opinions, experiences, and reactions in ways that would be impossible to do otherwise. These attitudes, sentiments, and opinions may be somewhat independent of a group or its social context, but they are more likely to emerge as a result of the social gathering and interaction that a focus group implies (Gibbs 1997). When there are power imbalances between participants and decision-makers or experts, when the daily usage of language and culture of certain groups is of interest, or when the degree of acceptance on a given issue is of interest, focus groups are particularly beneficial (Morgan and Kreuger 1993).

In the proposed study, the focus group is applied in **Chapters 4** to achieve Objectives 1 and 2. They are utilized to generate thoughts and mock designs to be used for more in-depth investigation with individuals through a dedicated interview study. They can also indicate conflicts and diversity in preferences which will correspond to the initial design of the proposed materials for Objective 3. Focus groups are applied in a multistage process. The first focus group is highly exploratory while the second is more design oriented to translate the findings of the first to mock designs and interaction and management patterns. In chapter 8, three focus groups were conducted for construction phase of the proposed materials itself which includes a trial for consensus building methods applied to achieve the final design features of analysis.

3.6.1.4 SURVEY

The survey strategy is used to gather data from a huge sample of individuals also offers researcher with great control over the study process (Saunders et al., 2009). Data generalisability can be improved if a appropriate sampling style is employed.

Survey sample help research to determine the accurate of result, there are two methods could be applied depending on the type and the objectives of the survey. **Probabilistic sampling** (AKA random sampling) is designed to provide an estimated population, the researcher selects samples from a larger population applying a technique based on the theory of probability (Lazar et al., 2017). The population sample needs to be well-defined and when the population is not clearly defined the strict random sampling would not be possible. In this thesis the estimated population is not used. However, random sampling may offer more effective results, a various technique could be used to

enhance the validity in the **non-probabilistic sampling**, e.g. oversampling (Lazar et al., 2017).(Babbie, 2013) summarized four kinds of non-probabilistic sampling:

- Convenience sampling: it is the most widely used sampling approach and focused on choosing participants who are easy to reach, it is consider a weak type of sampling (Gravetter and Forzano, 2018). Also, it could be obtaining biased findings as a result of few control around the representative nature of the sample. However, this technique can be adequate in exploratory studies in which the goal is inferences, such as in this thesis,(Sue et al., 2007). Furthermore, when the sample is rich sufficient. i.e. the participants belong to various groups, e.g. different gender, different cultures, wide range of age groups, etc., the researcher can raise number of target representativeness of the sample (Gravetter and Forzano, 2018).
- Judgmental sampling: the sample participants are selected based on the researcher's knowledge and judgment. the results derived from this technique, would be in extremely accurate with a minimum margin of error.
- Quota sampling: Researcher's select choose participants from a segmented population, the participant selects according to traits or qualities, e.g. male segment, and female segment. for example, choose 60 females and 40 males when the actual population is included of 60% females and 40% males.
- Snowball sampling: the participants choose to help to recruit other participants for a test or study.

The survey design questions are important and there are some issues that should be avoided when design the survey questions. Lazar et al. (2017) mentioned a few of popular problems with questions wording involving "double barrelled questions", biased wording and "hot-button" terms. (Lazar et al., 2017) also outline three signs of wording issues: (1) design a question with

very low score ,(2) design a question that had various responses when a particular one was supposed to answers or (3) when most of participants answers selected "other" options.

The survey aims to validate the qualitative results in chapters 4 and 5, in chapter 4 the qualitative results investigated the acceptance and rejection factors to online peer group platform and chapter 5 qualitative findings explored different preference of design the online peer group platform. furthermore, the survey design to study the effect of gender (male/ female); country; perceived usefulness of peer support groups; willingness to join a peer support group; the five personality traits [31] (extraversion, agreeableness, conscientiousness, neuroticism and openness); and self-control to the factors which explored in chapter 4 acceptance and rejection factors and chapter 5 the variability design requirements of online peer group platform.

3.7 DATA ANALYSIS

This section summarises data analysis methods employed in this thesis.

3.7.1 THEMATIC ANALYSIS AND CONTENT ANALYSIS

This is a useful method when the object is to identify themes and sub- themes from non- statistical or qualitative data (Braun and Clarke, 2006). The actual process can vary but should be both coherent and structured to ensure that identified are actually there. Braun and Clarke (2006) divide the thematic analysis process into a series of stages: familiarising coders with the data; establishing preliminary codes; determining the initial themes; reviewing these themes; identifying verified themes and writing up the results.

Content and thematic analyses both work on similar principles in seeking to decompose a large amount of text into smaller units of content of which it is constituted. Despite the similarities, content analysis is regarded as right for straight forwardly reporting common issues, while thematic analysis allows access to a richer and more comprehensive account of the data set (Vaismoradi et al., 2013). Thematic analysis has been used in this thesis to identify the themes in Section 4 concerning factors governing acceptance and rejection by online peer groups and those in Section 5 concerning factors in the variability in online peer group designs.to online peer group acceptance and rejection factors (see Chapters 4) and the themes of the variability designs factors for online peer group (see Chapter 5).

3.7.2 MEMBER CHECKING

Feedback obtained from participants in the research enables member checking for evaluation of qualitative data collected during research (Lundahl et al., 2010, Birt et al., 2016). Member checking reduces the likelihood of researcher bias by promoting internal verification of interpretations. In this thesis, member checking was used to verify the credibility of data analysis

from participants' point of view (Doyle, 2007). The process may be one-to-one, with the researcher interviewing a participant, or be part of a focus group session.

3.7.3 DESCRIPTIVE STATISTICS

This study used descriptive statistics and data visualisations to provide insights into the data to make population characteristics intelligible and ensure that quantitative interpretations of the data were reasonable. See Chapter 6 for more information.

3.8 DESIGN APPROACHES

The section discusses two common approaches to design: participatory design and user-centred design. These approaches use different methods to involve users and stakeholders in the design. To understand what could influence users to agree or refuse to join an online peer group it is necessary to understand user interactions with the group and what they look for from these platforms. This can also help to identify the online peer group's design factors. Users' active involvement in the design method may increase the likelihood that the design will be accepted, as the design is established on user preferences. The next two sections give an outline of the participatory and user-centred design methods.

3.8.1 PARTICIPATORY DESIGN APPROACH

Participatory design (PD) is a form of user centred design (UCD), the users are included in the development of the products and users become co-designers (Abrás et al., 2004). According to Spinuzzi (2005), PD stresses that “researchers and designers must come to conclusions in conjunction with users” in order to “examine the tacit, invisible aspects of humans” and make certain that their interpretations are considered. There are three stages in PD:

- 1- **Stage 1 Initial exploration of works:** in this stage, undertaking bottom-up examinations and stimulation are utilized in order to gain insight (e.g. observations, ethnography and organisational visits).
- 2- **Stage 2 Discovery processes:** in this stage, co-operative group engagement provides a deeper appreciation of the values, goals and desired outcomes so that they can be suitably prioritised. It is at this time that consideration should also be given to identifying concepts that govern how software constructs such as adaptability and interfaces are designed.
- 3- **Stage 3 Prototyping:** in this stage, the process of iteratively form design artefacts from the perspective of delivering proof of principle (i.e. concept prototyping). It may also address functional aspects (i.e. functional prototyping). This approach to prototyping is effectively an engineering tool that can be employed to arrive at several goals such as gaining an appreciation of users require and operational context, collection, refining and confirming

needs, evaluating the suitability of design decisions, investigating design problems and encouraging progressive knowledge in the communication and development team.

PD stresses the importance of representing users' involvement in the design process. Provided that caution is exercised, the same method can be applied during the design procedure for intervention tools in future. There may be conflict between the principles of representative users who engage in the design process and the principles of people (Kujala and Väänänen-Vainio-Mattila, 2009). Therefore, it is possible that the interest and engagement of real users could be jeopardised.

Be that as it may, it is necessary to develop guidelines based on best practice to direct user involvement. This is especially important when dealing with addicts who may be in denial about their true situation. As such, further research is required to utilise user-centred and participatory approaches when developing technology capable of regulating digital addiction. For instance, it remains uncertain whether former addicts should be involved in the design and testing processes or, in what way they could be used. Former addicts may well have empathy for the situation that they find themselves in, but it can also be distinctly possible that they might be biased and impose their own opinions that have been formed as a result of their personal experience.

3.8.2 USER-CENTRED DESIGN

User-centred design (UCD) is an approach to design a system for users that requires to involve users requirement through the design process, especially through requirements collecting and usability testing. UCD focuses on the relationship between human computer interaction (HCI) and design practices in which satisfying users' needs depends on users becoming involved (Marcus and Wang, 2017).

Meanwhile, Lowdermilk (2013) noted that the purpose of user engagement is not merely to give a retail knowledge; rather, users should be led through the engagement process in order that their knowledge can be fully exploited. Failure to do so may result in significant mistakes being made. (Abrams et al., 2004) have issued guidelines advising on how and when users should be participating in the design process:

- Users' needs and expectations can be gleaned from questionnaires and interviews at the start of the design process.
- In order to gain a better appreciation of the work sequence, additional questionnaires and interviews are deployed in the early stage of the design process.
- During the early design cycle, several focus groups and on-site observations are used to amass data regarding the environment in which the system is to be deployed.

- In the early-to-midpoint of the design cycle, role-play and simulation are availed of for the purpose of evaluation and for further information.
- In the final stage, interviews, usability testing and questionnaires are used to acquire both qualitative and quantitative data to gauge usability and satisfaction.

3.9 ETHICAL CONSIDERATION OF RESEARCH DESIGN

Ethics are the norms, standards of behaviour, or moral values guiding individual's communications with others (Bell et al., 2018). Research projects involving human or non-human animals demand that the researcher consider possible ethical issues (Saunders et al., 2009). The initial stage for any researcher should be to ask for and be granted approval from the ethics committee of the university or research institution involved, and (Saunders et al., 2009) notes the need to also obtain ethical approval from gatekeepers to grant, since this could influence the possibility of ever implementing the research design.

It is fundamental to research ethics that the rights of human participants must be safeguarded. Only those who have provided voluntary, informed consent should be allowed to participate and even those who have so provided must retain the rights to withdraw at any point without giving a reason, to privacy, and to anonymity and security. Clear systems must be in place throughout the research to ensure the appropriate handling of these rights. For example, there must be evidence that consent was given and was informed and voluntary, information sheets must be given to participants fully outlining what their participation entails, and they must receive clear explanation of their rights and protection concerning data.

Ethical approval for this research was received from BUREC (Bournemouth University Research Ethics Committee), and steps have been taken to make sure that participants were exposed to no greater risk by taking part in this research than they encountered in the normal course of their daily lives. Every participant signed a consent form before taking part and was required to read information contained in these forms concerning their rights. An information sheet was also provided explaining in complete detail the research objectives, questions, participants' roles, measures to ensure data protection and assurances of anonymity. Any information that could be used to determine participants was filtered from all collected data, which were then stored in a secure location.

When running an online peer group, a variety of ethical issues arise. When using online interventions, the purpose of the online peer group should be made explicit to the participants of the online peer group that this is not a replacement of the formal therapy and it is meant as a forum for support and sharing experience and installing hope. Also, group members should be made aware of how their information will be used. Information use by third party developers should also be made clear to the group members. The moderator should be aware of and knowledgeable

about a variety of ethical issues. First and foremost, the moderator must be familiar with proven successful online therapy procedures, as well as their scope and limits. In order to properly employ services that promote confidentiality, a therapist moderating the group should also have a basic grasp of online application development and hosting options (Midkiff and Wayatt 2008). An online therapist's skill might be proved by a study of his or her experience, training, and other credentials. As with all health-care interventions, the possible risks must be assessed against the potential benefits. The mere presence of risk does not prevent the adoption of an intervention if the prospective benefits are properly justified (Childress, 2000). However, it is expected that the therapist maintains a thorough grasp of the risks and educates clients about them (Midkiff and Wayatt 2008). The participants' understanding of the moderator's role was one of the most crucial ethical problems. The moderator also informed members of the group that she did not check messages on a regular basis and that they should not expect rapid or personal responses from her (Winzelberg et al. 2003). Online intervention designers and developers must be extremely explicit about the amount of psychologic care they will give and how they will address psychiatric crises that may develop during the intervention (Winzelberg et al. 2003). A second significant ethical problem is the participants' privacy. Setting clear expectations and instructions for the participants is critical. It is essential to make it clear to peer group members not to share any information they obtain about group members with anyone and not to provide friends and family members access to the online intervention (Winzelberg et al. 2003).

The COVID 19 pandemic have pressured many therapists to move their programs to online forums (Weinberg, 2020). Surprisingly, several of them did not find it as unpleasant as they had anticipated. Online counselling became the standard within a few weeks of the pandemic. According to a recent survey, three quarters (76%) of the more than 2,000 American Psychological Association (APA) member doctors who replied claimed they currently only provide remote services to their client (Association, 2020). The transition to online group therapy, on the other hand, appeared to be more challenging (Weinberg, 2020). According to (Békés and Aafjes-van Doorn, 2020) a survey of therapists who switched to internet counselling indicated that despite the stressful environment of the COVID-19 epidemic, their findings suggest that attitudes regarding online treatment are generally favourable. Perhaps training can both lessen self-doubt and improve online job abilities. Changing from the office circle to the computer screen necessitates new skills and training. Given that online psychotherapy experience has been linked to more positive attitudes about it, it's feasible that once the initial anxiety decreases and psychotherapists get more experience and training, they'll feel more at ease utilising videoconferencing for online psychotherapy (Békés and Aafjes-van Doorn, 2020). It is still early to judge whether online therapy can replace office therapy but from these findings it can be argued that a blended approach is possible.

3.10 RESEARCH METHODS AND OBJECTIVES

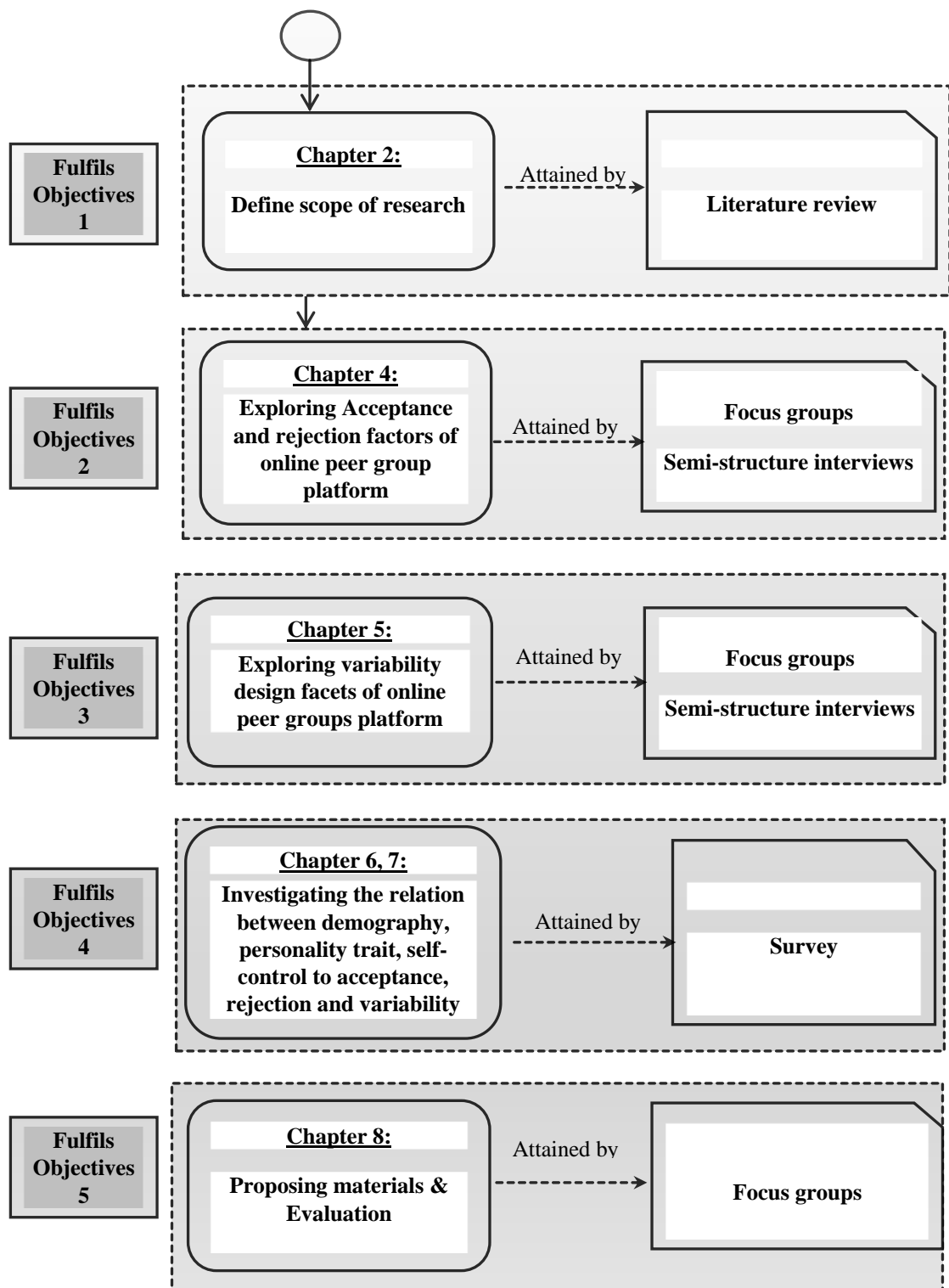


Figure 14 shows the research method that will be followed to help achieve the research objectives.

3.11 CHAPTER SUMMARY

This chapter summarised the research approaches, and strategies that will be followed in this research thesis. This chapter did not provide detail information about the steps and processes employed in each approach and the design adopted. Such details are provided the respective chapters as well as the information associated with the activities conducted to help enforce the steps and process adopted from the research methodology. In the next chapter the acceptance and rejection factors are explored that motivate users to join and reject an online peer support group for controlling problematic digital media usage.

4. CHAPTER 4: ACCEPTANCE AND REJECTION FACTORS

This chapter will explore the acceptance and rejection factors of online peer support groups as a mechanism for changing people's problematic behaviour. This chapter will also explain the qualitative research adopted to collect the data and explore the finding.

There is an interest in adopting technology-assisted behaviour changes in several domains of addiction addictive and problematic behaviours and is considered an emerging topic. Several online interventions being used in various domains, for example, are being used Web-based instant messaging technologies to encourage alcohol addict to be responsible for the amount of drinking (Bewick et al., 2008). Also, mobile applications become an interest in delivering behaviour intervention for health which can use internal sensors to infer contexts such as automated tracking movement, emotion or health-related behaviour for specific contexts. Many thousands of commercial apps have already been developed to assist people with behaviour change such as managing stress, diet and eating disorders (Pagoto et al., 2013), smoking cessation and self-management chronic health problems. Despite the increasing availability of a range of health-related apps on the market, there is a lack of the development and evaluation of such apps in the relatively early stages in research.

This chapter explores the acceptance and rejection factors of online peer support groups as a mechanism for combatting DA. Acceptance is vital as members of the group report their online use, emotions, and intentions voluntarily. Although technology can be designed to monitor digital usage, people can always find ways around it if they so desire, e.g. using different devices and accounts or claiming that the use was necessary for work reasons.

4.1 RESEARCH METHOD

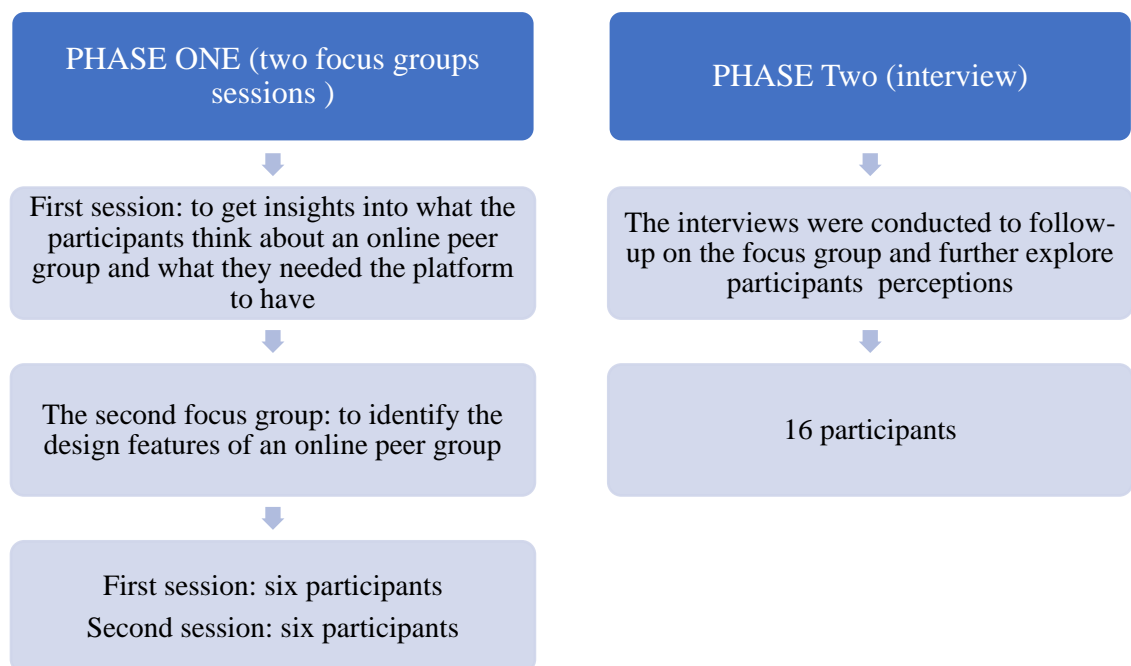
A qualitative method was adopted to explore the acceptance and rejection factors of people with DA to join online peer support groups to combat their DA. The data collected and utilised from two studies to increase the credibility and coverage of the findings see Table 7.

Focus group justification: As prior research on online peer support groups failed to investigate representative users' acceptance and rejection factors of such platforms, the focus group session conducted in this chapter allows the author to explore this area. The focus group technique seems to allow for a more in-depth study of participants' perceptions of the acceptance and rejection factors of online peer groups and the reasons for their opinions (Nyumba et al. 2017). Therefore, a focus group was used in this chapter to collect main themes and insights relating to the acceptance and rejection factors of online peer support groups as a mechanism for managing/controlling DA. These preliminary results will lay the foundation for further studies, for example, conducting interviews with the same or different participants to explore the findings

of the focus group in more detail. In this thesis, the interview participants were different from those who participated in the focus group. This allowed a new perspective to the findings and enriching them more.

Interviews justification: The interviews were conducted to follow-up on the focus group study participants' opinions and further explore the perceptions of the acceptance and rejection factors derived from the previous study. In addition to elaborating further and refining the acceptance and rejection factors from the focus group study, the interviews were conducted to identify more factors that would enable users to either accept or reject the online peer group. Another justification of the interviews is that the researcher wanted to delve into the details of the personal experience of each participant and how they see it from individual perspective. Focus groups does not usually allow such in-depth elaboration on the personal experience and hence the choice of interviews.

TABLE 7: METHOD PHASES



4.1.1 PHASE ONE: USER'S FOCUS GROUP

In the first study, we performed a secondary analysis of a focus group study of two sessions. The first session aimed to get insight into what the participants think about an online peer group and

what they needed to have (see **Part C, Appendix 1**). The second focus group served the purpose of identifying the design features of an online peer group (see **Part D, Appendix 1**). For this reason, mock design interfaces made based on the result of the first focus group were built and presented. The participants were asked about opinions regarding the mock design. However, for the secondary analysis, the data collected from the focus group were re-analysed from the TAM perspective (Davis et al., 1989). Doing so reveals the main factors concerning the acceptance of this approach in order that further primary studies can be undertaken to examine them in greater detail. As such, the secondary analysis was necessary in order to provide a template for the subsequent primary studies, Table 8 provides summary details for each of the six participants in the current study. A convenience sampling approach was adopted. Each of the participants was closely related, which is beneficial because this removes queries regarding trust and privacy during the discussion process. However, this does not mean that the thesis's final solution will be oblivious to these two factors. Instead, the intention was to ensure that the group could address all issues in an open environment.

Each of the participants received an explanation that peer groups were to be used for those experiencing problematic use of online usage (e.g., obsessive or compulsive use) so that they could work together and help each other to control the problem. The participants were informed that their online activity would be recorded in terms of duration and frequency so that these results could form the basis of future group discussions and be used to trace the progress being made by the group. Participants were made aware that the use the term Digital Addiction colloquially. One-way positive change can be brought about is a rewarding system through gamification elements (badges, leader board and points) to identify the best performers.

TABLE 8: PARTICIPANT DEMOGRAPHICS

Participants	Age	Ethnicity	Gender	Education	Digital Addiction self-declared level
Participant 1	26	British - Indian	Male	Bournemouth University- Computing forensics	Mild
Participant 2	26	British Indian	Male	Bournemouth University- Computing forensics	High
Participant 3	22	British Pakistani	Male	Bournemouth University Computing forensics	Low
Participant 4	21	British White	Female	Bournemouth University- Business & Marketing	High

Participant 5	21	British White	Female	Bournemouth University – Events Management	Mild
Participant 6	20	Mixed Race British white and Spanish	Female	Bournemouth University– Marketing	Mild

In order to ensure that the discussion was suitably focused, each of the participants was selected because they were known to have problematic use of social networks. The participants were also told that there were various roles to be played in the group setting, either spontaneously or on a pre-planned basis. For instance, some participants may be designated a specific role such as the facilitator, whereas others may inadvertently fulfil a disruptor's role. The main topics addressed by the focus groups concerned the following:

- General opinions about the problem they experience
- General opinions about the use of online peer groups
- Motivation to join and participate
- The design of online peer group platforms to become attractive
- The design features to incentivize both participation and also retention.
- The design features that could be used to encourage participation and retain users

Figure 15 was presented to the participants to be aware of the design, and their subsequent discussions could be more focussed.

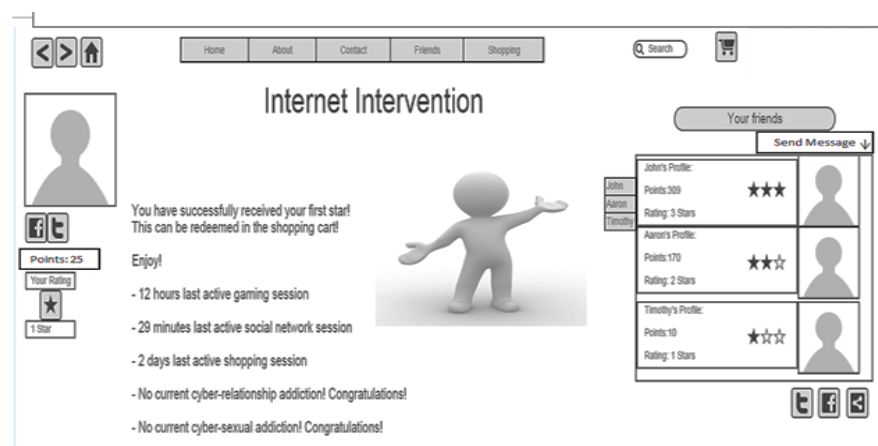


FIGURE 15: MOCK DESIGN INTERFACE SAMPLE 1

As part of the original study, thematic analysis was undertaken primarily for the design features and the aspects that would need to be supported by the online peer group platforms. Based on this, mock designs were developed, and a further focus group session was held.

The resulting designs that were developed are presented in Figures 16, 17 and 18:

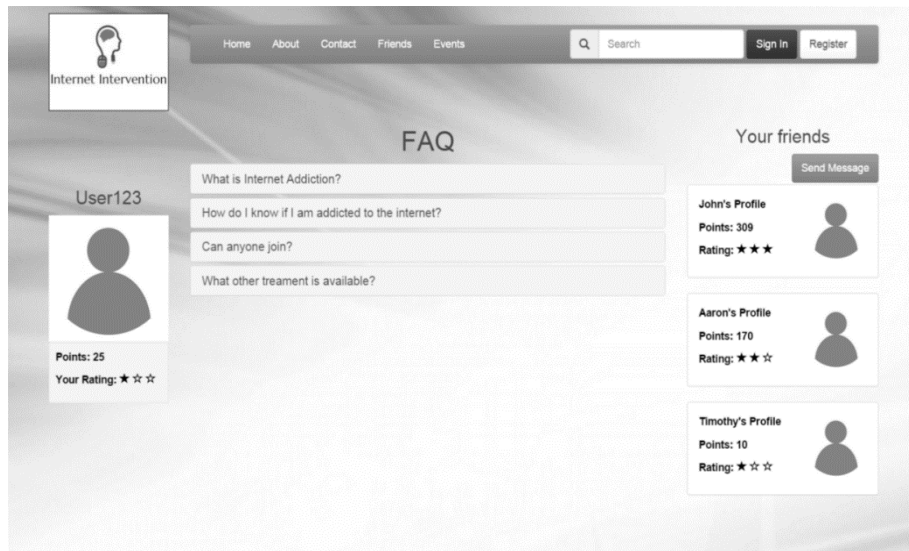


FIGURE 16: MOCK DESIGN INTERFACE SAMPLE 2

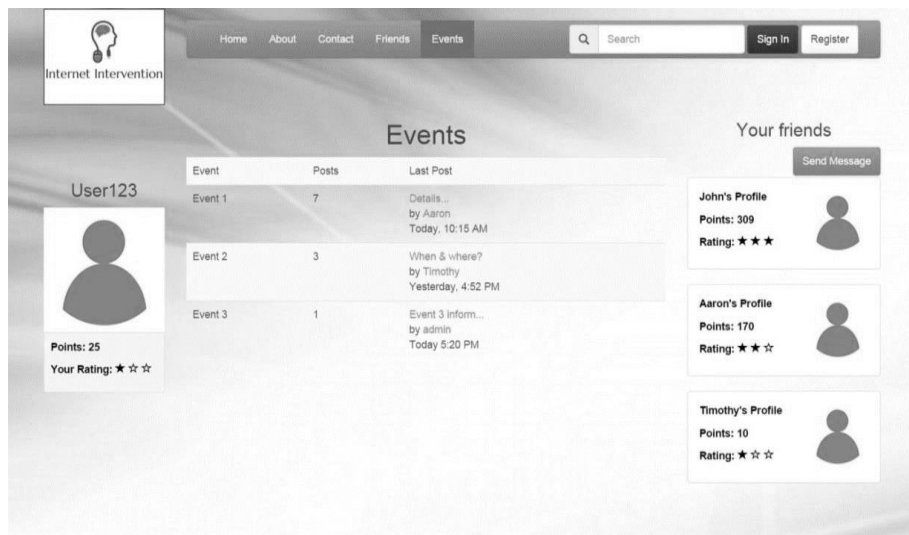


FIGURE 17: MOCK DESIGN INTERFACE SAMPLE 3

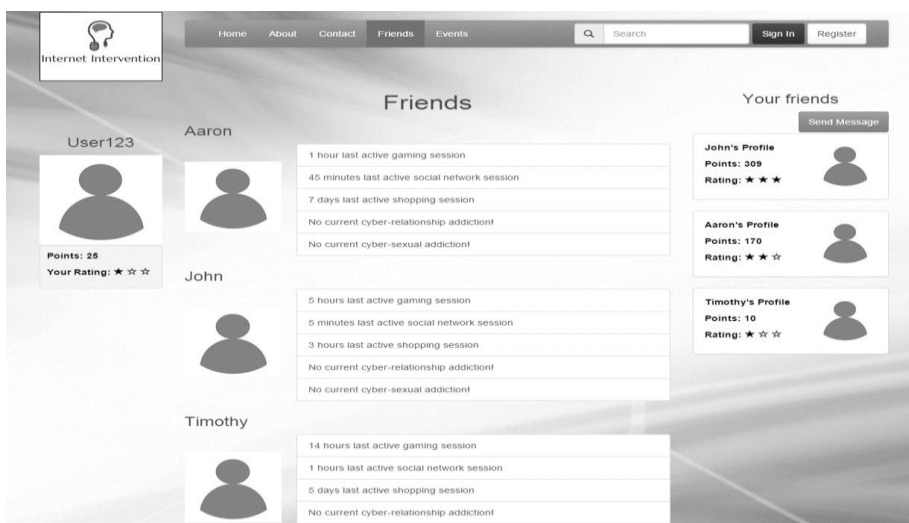


FIGURE 18: MOCK DESIGN INTERFACE SAMPLE 4

P3 withdrew from the second focus group and was replaced by somebody active in the area of 3D animation. They were British African, 22 years of age and had a close relationship with the other group members. Furthermore, the replacement considered that he only have a low level of digital addiction.

The participants were presented with the design created from the focus group findings, and were asked for their opinions on the following matters:

- Initial reaction to the design
- The design layout and how this contributes to the goal of the site.
- Whether the use of an avatar as part of the gamification feature would make users more motivated to engage
- How easy it is to navigate.
- The colour scheme that has been chosen
- The role of the arbitrator and whether they will accept or reject the recommendations.
- Further interactive features that could be incorporated
- Any personalisation that they consider could be beneficial.

Audio recordings of the two focus group sessions were made and subsequently transcribed word for word. The transcripts were used to develop the initial template for the current study and help compose more focused interview questions

4.1.2 PHASE TWO: USERS INTERVIEW

As a result of the focus group study, several themes and notable facets regarding online peer groups emerged. An interview was subsequently undertaken in order to elaborate further on these matters.

A total of 16 students known to experience problematic use of online services (e.g., obsessive or compulsive use) were interviewed at Bournemouth University. Each of the participants self-declared whether they had a low, mild or high degree of a usage problem. We emphasise here that the use of Digital Addiction was informal and participants were aware of that. In other words, we used it as a colloquial name to denote a problematic usage of technology. Those who have a high-level problem demonstrate a compulsive attitude, spend considerable amounts of time on social networks and typically cannot reduce their usage. Those reporting a low-level problem only occasionally experience issues with their online usage. Finally, those reporting a mid-level problem acknowledge that sometimes their usage is somewhat excessive and can occasionally become compulsive. The interview was designed in a way that specifically sought to establish the acceptance factors among the online peer group as well as the design features. Table 9 provides

summary details for each of the 16 participants in the current study. Each interview lasted between 30 and 40 minutes.

TABLE 9: PARTICIPANT DEMOGRAPHICS

	Age range (years)	Nationality	Country of Residence	Gender	Education	DA Level
Participant1	[30-35]	Indian	UK	Male	PhD Student	High
Participant 2	[30-35]	Pakistani	UK	Male	Post-doctorate	High
Participant 3	[25-29]	Pakistani	UK	Male	PhD Student	Mild
Participant 4	[30-35]	India	UK	Male	PhD Student	Mild
Participant 5	[18-24]	British	UK	Male	BSc student	Mild
Participant 6	[30-35]	Indian	UK	Female	MSc student	High
Participant 7	[18-24]	English	UK	Male	BSc student	High
Participant 8	[30-35]	Indian	UK	Female	PhD student	High
Participant 9	[25-29]	Pakistani	UK	Male	PhD student	High
Participant 10	[18-24]	British	UK	Female	BSc student	High
Participant 11	[30-35]	Turkish	UK	Female	PhD student	High
Participant 12	[30-35]	Venezuelan	UK	Female	MSc student	Mild
Participant 13	[25-29]	Mexican	UK	Female	MSc student	High
Participant 14	[25-29]	Pakistani	UK	Female	PhD student	Mild
Participant 15	[25-29]	Pakistani	UK	Male	PhD student	Low
Participant 16	[36-40]	British	UK	Female	PhD student	Mild

The interview questions have been designed to yield further insight and details of the specific factors associated with accepting the online peer group. Furthermore, the interview questions have been developed based on the results of the focus group secondary analysis. The results of the focus group revealed five aspects that govern acceptance of online peer groups:

- Aspect 1: Moderator and facilitation: e.g. knowledge, authority, role and permission
- Aspect 2: Design and content: e.g. feedback, tracking system, design intuitiveness, notification messages
- Aspect 3: Governance and operation: e.g. management style, reinforcement functions such as reward system and penalties, roles
- Aspect 4: Group coherence and trust: e.g. relatedness, group size, commitment, exit protocol
- Aspect 5: Goal setting and commitment, e.g. individual and collective goals, goal support

The interview questions' (see **Part E, Appendix 1**) primary focus is to examine the acceptance facets for online peer groups and the factors that determine whether an individual is likely to be motivated to join a group or deterred from doing so. A semi-structured interview approach is likely to be best suited for such a task. The interviews were transcribed and analysed via thematic analysis following Clarke and Braun (2014). The analysis explored different aspects that affect users towards accepting and rejecting an online peer group.

Ethical consideration and obtaining ethical approval is relevant before and when conducting the various user studies. This is because the information to be used in the thesis, e.g. this chapter, will be collected from representative users. Also, the results section will include quotes obtained from the study participants which could be traced back to their original source, i.e. the collected study data. Therefore, the participants' consent for the use of such quotes in the thesis is essential. Ethical considerations would help the researcher to ensure that all collected data is kept anonymous, for example, not linking participants' names with the quotes included in the findings. Therefore, it is essential to consider the ethical values of the study participants before, during, and after the study. In addition to the ethical issues in conducting research on this topic, ethics could be considered part of the requirements for the online peer support group, for example, in the design aspects related to privacy, accepting or rejecting membership and establishing trust. Articulation, which is one of the activities for ensuring ethics aware software engineering, involves eliciting, modelling, and analysing ethics values for software artefacts and development processes, what we call ethics requirements (Aydemir and Dalpiaz 2018). According to (Kalloniatis et al. 2008; Ghanavati et al. 2009), some ethical issues, like privacy, are already considered as quality criteria in existing practices. In this chapter, the study participants raised privacy as one of their important issues when deciding to join or reject the online peer support group. This had also implications on the design. For example, some asked to not permit other group members to have access to goal performance and interactions.

4.2 FINDINGS

This section will present the factors that would affect the acceptance and rejection of people with DA of the online peer support groups. We note here that some of these preferences are contradicted with each other. This would be expected from people with problematic behaviour who often have conflicting requirements about their health, on the one hand, and their desire to continue the problematic behaviour, on the other. Common attitudes and maladaptive behaviours which facilitate that conflict include denial, trivialization and cognitive dissonance (Alrobai et al., 2016b)

4.2.1 ONLINE PEER SUPPORT GROUPS TO COMBAT DA: ACCEPTANCE FACTORS

Different aspects and perceptions explored during the interview contributed to identifying the factors that affect the user's acceptance to join an online peer group focused on combating digital addiction. These factors should be considered when software and systems engineers design and introduce an online peer group for users who have a problem using digital media. Figure 19

illustrates the acceptance factors that affect users' decision to join an online peer group. In the following subsections, we present these acceptance factors in detail.

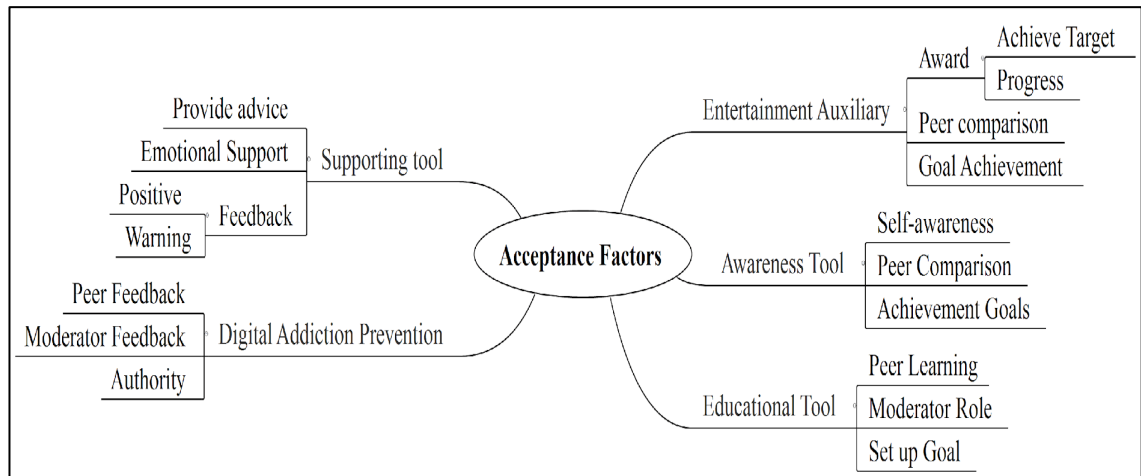


FIGURE 19: ONLINE PEER SUPPORT GROUPS TO COMBAT DIGITAL ADDICTION: ACCEPTANCE FACTORS

4.2.1.1 ACCEPTING ONLINE PEER GROUPS AS AN ENTERTAINMENT AUXILIARY

An essential factor motivating participants to accept an online peer group is its introduction as one of the "entertainment tools" that will ease the DA prevention and recovery processes. The participants prefer the online peer group to include entertainment media that incorporate the feedback, advice, or information to increase users' knowledge about the issue, create positive attitudes, and change behaviour (Singhal and Rogers, 2002, Moyer-Gusé, 2008). Participants suggested that these tools should include gaming elements that are implemented and adapted as a reinforcement function. This function corresponds to motivating group members to regulate and control digital media usage. That reinforcement function should be designed to be "fun and look like a game" by including "rewards" and "comparison". The participants have three viewpoints in how to establish that: peer comparison, awards and achievement goals.

Award

The first viewpoint is that participants prefer the online peer group to provide an award as an entertainment auxiliary, which is considered one gamification mechanism. The participants recommended that the group apply some gamification elements that seek the group to have some of the enjoyable aspects of games, such as fun, play and challenge. Gamification in the online peer group aims to influence the group members to change particular behaviour and attitude using some gamification elements such as penalty, award or leader board (Antonaci et al., 2019). Specifically, the participants thought that the platform should have rewards mechanisms to "motivate them to achieve group goals" and "regulate digital media usage". The participants have

two preferences regarding the strategies they should follow to provide awards to group members.

The first preference is that the participants recommended that the online peer group have an awards mechanism and be designed to have entertainment and gamification elements. To design the awards to be fun and challenging, some participants suggested that the group have more than one target to achieve and recommended the awards provided to the users who achieved targets. Some of the participants recommended the group to be designed to have some challenges, and the group has more than one level and design like game levels. For example, some of the participants prefer the "group should have several targets to achieve; if a user achieved a certain target, the system should move the user level as a reward". The participants suggested various types of fun awards when the user achieves the target. For example, *"users who achieve the target system provide points, any user collects 10 points, and the system replaces it with badges"*.

The second preference is awards provided based on user progress. The participants suggested the group must have goals also, awards provided to the user who achieves progress toward the goals. Several types of awards mentioned and would encourage users to achieve progress toward the group goals. For example, some of the participants agreed the platform should use the point's reward scheme and argued points are useful and could motivate users to work hard to collect more points. As an example of how these points could be materialised, a participant suggested that a user who collected *"10 points could replace it and get a gift or voucher"* or *"upgrade their level in the group"*. Other participants preferred to receive social recognition rewards. For example, members who achieve good progress could have their names or pictures displayed on the platform's main page or could receive a *"congratulations"* message from the system, visible to others.

Peer Comparison

The second viewpoint participants prefer the online peer group should have peer comparison and be designed as fun and entertainment. Peer comparison compares users' performance and progresses with other group members to enhance self-improvement, self-motivation and positive self-image. This is in line with Altermatt and Pomerantz (2005), Gibbons et al. (2000) study findings that showed adolescents' interaction with peers who were motivating changes in academic performance. Participants mentioned that peer comparisons could sometimes be healthy to measure their performance and their level of problem. The overall participants felt that comparing the performance with peers would be useful, especially when considered fun and have entertainment tools such as game function. A participant comments that *"Actually, I play online games and my friends as well; I shared my game levels with my friends that would influence me to be the best player, and the online group should be like that"*. Also, some participants saw peer comparisons like the competition between the members and winner and loser members that would

motivate members to regulate the digital media usage. For example, a participant mentioned that *“I think the comparison would be like playing a game, you can compare your rewards against others. Say like if one student used digital media for three hours and I used six hours, I will be like, “I think I’m in a bit of a trouble here” and that would encourage me to reduce my usage and use less than others, it is like everyone wants to be the winner and, in the comparison, wants to be the one who use less”*.

Participants felt that comparing user performance with peers would be effective and could encourage peers to reduce usage and progressive change. However, it seems some of the participants are concerned about unreasonable comparisons to members, such as compared with peers who have achieved unusually high progress that could lead to negative influence or cause them to leave the group. The participants were also concerned about comparing the user’s progress with peers with different addiction levels since this kind of competition could impact self-esteem and self-efficacy. A participant mentioned that *“When a group has members who have different levels of addiction and skills, and when the system compares progress with them... that might demotivate lower-performing people, and then at the end, they might end up relapsing”*.

Overall, the participants agreed that comparing performance and progress with other group members would motivate members to set up goals and targets for the usage and benchmark themselves to others. Additionally, some of the participants stated that they would *“enjoy sharing and comparing usage with other members”* and would find it essential and inherent to the sense of being in one group.

Goal Achievement

The last viewpoint is achieving group goals. The participants recommended the group set goals that are specific and achievable, improving users’ performance. The participants’ concern about complex and challenging goals, they argue the complex goals are not easy to achieve and could affect members’ self-esteem and feeling. Also, some participants recommended the goals must involve more than one target and should have the group members pre-commitment to achieve a certain target in a specific time that would help members feel a challenge between group members to achieve the group goals. To increase the group members’ challenge, the participants recommended the online peer group have a monitoring system that monitors the member performance toward the goals target. Any member achieves the target rewards could be provided, such as *“points”*.

Also, participants recommended two sources of setting the goals. Goals could set individual or self-set goals, or some of the participants would prefer the group to have goals established with other group members. In this line, the participants argued that unified goals, applied equally on everyone, or a set of group-agreed goals allocated to members separately would create

competition between members to help them achieve the goals. They felt that such group goals are “*fun by increasing competitiveness between group members*”. However, they argued that unified goals should be “*between peers who have similar levels of addiction*” and would be more effective with “*peers who share the same interests, such as working in the same organization or are post-graduate students*”.

4.2.1.2 ACCEPTING ONLINE PEER GROUPS AS A DA AWARENESS TOOL

Participants appreciated the role of an online peer group as an awareness raising and knowledge sharing. The participants mentioned that the online peer group would help raise their awareness of digital media usage and the problem if they have also helped them decide if they know the problem. The participants mentioned three viewpoints would motivate them to accept the group as awareness tools, such as awareness revolved around self-awareness, peer comparison, and ways to achieve goals.

Self-awareness

The first viewpoint corresponds to some online peer group participants’ expectation to help them become more conscious of their usage and the amount of time spent in “each digital media app”. Moreover, they required the online peer group to have a monitoring system, which can track and monitor “the frequency and the time spent using digital media applications” by members. Some participants mentioned that the monitoring system should be accurate when tracking user usage and should display the “frequency and time in each digital media application” to help users self-assess and be aware of the most applications used.

Feedback is useful to raise group members’ awareness and help *users*’ self-rate digital media usage. Some participants recommended that the group send a popup warning message to convince users to be aware of the usage, but they are concerned about the “frequency of the popup message and the time”. They argued to ***accept*** the popup warning feedback should the system design allow users “to customise the frequency and time of the popup feedback”. Other participants recommended the group have a moderator who can access the members’ usage and send feedback based on the usage. The moderator feedback is a strategy that can be used to influence and raise awareness of usage of digital media and that based on the monitoring usage.

Moreover, most participants commented that they need to be aware of “their level of addiction to digital media usage” because they may be thinking that their usage is “normal, but maybe they are addicted”. The participants also recommended that the group moderator or the platform send a weekly report that includes average user usage and the level of addiction that would help raise user awareness toward digital media usage. This conflicts with other statements made by participants around the personal and context-dependent nature of digital devices’ usage and that judgmental approaches towards the claims of having DA are to be avoided.

Peer comparison

The second essential viewpoint about utilising online peer support groups as an awareness tool relates to peer comparisons. In this context, peer comparisons can help group members become aware of their digital media usage and their level of addiction through benchmarking. This can be done through various metrics, including time and frequency and the context in which digital devices are used, e.g. during work, meetings or meals. The comparison can also be non-usage related, e.g. emotions felt while detaching from social media and coping strategies used. Participants agreed that the simple comparison amongst their usages would help increase awareness of their usage. If they “*used more than the rest, that would motivate them to reduce usage*”.

The interview indicated that peer comparison is useful to raise members’ awareness toward digital usage, but they suggested the online peer group should consider some peer comparison criteria. The peer comparison criteria are some participants preferred to compare their usage with the group members who have a similar level of addiction, share similar interest, or enrolled in the same educational programme. A participant, who is a PhD student, mentioned that “*it is useful if the group members are PhD students so when the platform compared my usage with group members and the platform showed my usage is more than others then I have to be more aware of my usage*”. They prefer that the platform sends a weekly comparison report and that the report compares “*their usage with past-usage*” and compares “*their usage with group members*”. We note here that metrics for comparison around DA are to be investigated further in future research. Participants emphasised that their use of social media might be for work and hence be given a different weighting for its contribution to the problematic usage. They also explained that usage calculation should be more sensitive to the context, e.g. festive season vs work or sleeping hours.

Achievement Goals

The third viewpoint is one of “achieving group goals”. The participants prefer to set up group goals that help their commitment to achieve more control usage and become aware of their progress towards achieving their targets. The participants mentioned the member who cannot achieve the proximal goals or face difficulty committing to the goals that would raise member awareness of the problem using digital media. Also, a participant mentioned that the user who set-self goals should commit to the goals. However, if the user cannot achieve the self-set goals and reduce their usage that would not help them be aware of having problematic self-control digital media usage.

Reminders and notification messages seemed to be highly needed as participants stated they might become unconscious of the usage and its amount and context. The group moderator or system could send a notification message to notify the user of the amount of “*time spent using digital media*” to help members notice their usage. Furthermore, the system or group moderator could

send a warning notification message which “*makes the user aware of usage*” and when the user “*exceeds the time limit of usage*”. Moreover, the group moderator “*would block the digital media apps for a day because the user exceeded the limits*”. However, it is essential to note that the participants were concerned about the “*notification time*” and “*how many messages to send a day*”. They are not in favour of the system exceeding the notification messages more than once a day. Again, we note the conflict between being looked after by the system and the requirements of privacy and non-obtrusiveness.

4.2.1.3 ACCEPTING ONLINE PEER SUPPORT GROUPS AS AN EDUCATIONAL TOOL

The participants considered online peer groups as an educational platform. They generally preferred that such platforms provide functionalities that would help them learn how to control their digital media usage and find life alternatives. They have three viewpoints regarding where to obtain this knowledge from; from peers, group moderators, and by setting up group goals and learning how to achieve them.

Peer Learning

The first viewpoint is that the participants mentioned that the online peer group should apply peer to peer learning as education tools about members teaching other members. Peers can learn from each other and “*share strategies they follow*” to help them control digital media usage while they are all trying at the same time, as this can have both educational and motivational value. Peer learning is also an effective method to transfer and share knowledge and experiences between members who have similar or different levels of digital addiction. Participants recommended that the group have collaborative learning. The group members collaborate to express opinions, ask for help and offer help when needed to regulate digital media usage or emotional support. *Learning in collaborative group members is more effective for peer learning. Some research studies indicated that users involved in collaborative learning in groups perform better, persist longer and have enhanced self-esteem (Boud, 2001).*

Regarding the first viewpoint, the participants mentioned that they could learn from peers who had successfully achieved the group goals before “*asking them questions & receiving advice regarding how they reduce usage*”. Moreover, participants mentioned that they could learn from peers’ personal and real-world stories; thus, they prefer interacting with any ex-addict member or one who has successfully achieved the group goals. Some participants focused on education by storytelling which can help motivate the audience to change their behaviour and learn how to achieve goals. The participants argued that peers could tell a story useful to pass on knowledge, especially when information is embedded in a story’s context. Such share adds to the relatedness and sense of belonging in the group and acts as a hope installation mechanism. Gaming addiction

would be one clear example here. Participants who used to play games heavily found it difficult to find alternatives to games, especially after building their online community around it.

Moderator role

The second viewpoint that affects acceptance of an online peer support group as an educational tool is the moderator's role. The group's moderator has been seen as an educational one, and it is expected that the moderator has knowledge and experience in DA. Some participants prefer to learn from moderator leadership roles such as sending warning and guidance feedback, setting up and discussing the goals and managing the group.

In this sense, the moderator would deliver this *“knowledge to the group's members by providing advice”*. In order to empower this educational role, the group moderator should be enabled to *“monitor the group member's usage”* and, based on the monitoring result, would then be able to *“know their level of addiction and provide support and guidelines suit to them on how to reduce usage”*.

Moderator would have the ability to manage the group members' interactions and provide guidance to members who need help and motivate members to achieve the group goals by sending feedback. Participants prefer group members to learn from group responsibilities and the strategies to support and encourage members. The participants mentioned that they could learn from the moderator's *“advice and guidance”*, which would help them control and combat addiction.

Some participants preferred the group to help users gain management and communication skills from the group moderator role, which would help users gain confidence in leadership skills. Moreover, the participants believed that the online peer group could use some kinds of *“role-playing”*, which is similar to *“game learning”* (Sousa and Rocha, 2017) as a way of changing behaviour. They suggested that the moderator's role could *“rotate”*, meaning that after a period that *“any member who has accumulated high points”* could be a group moderator for some time. The moderator *“could provide advice and rewards to the members”* and *“set up the group goals”*.

Set up Goals

The last viewpoint around education corresponded to setting up usage goals and learning how to achieve them. Goals seem to have the added value of being an additional motivation to learn. Some participants mentioned that collective goals would help members learn and gain conceptual knowledge of the procedure to set the goals and review their skills and ability. A participant commented that *“I do not know how to set up goals, and the group moderator should set up the goals at the first stage of the group then I will learn how to set up the goals”*.

Participants agreed that setting up achievable and realistic goals is also an essential factor to sustain the motivation to learn how to achieve them. Even though some of the participants preferred to set up their own goals, they also mentioned that the group moderator should be able to check if the goals are reasonable and achievable. In case they are not, the moderator should “*explain how they can set up achievable and reasonable goals*”. In other words, education can also be around goal setting skills.

4.2.1.4 ACCEPTING ONLINE PEER SUPPORT GROUPS AS A DIGITAL ADDICTION PREVENTION TOOL

Using online peer support groups to prevent digital addiction seems to be one of the acceptance factors. The participants agreed that such platforms should have monitoring and feedback features administered by the group moderator, peers or automatically.

Moderator Feedback

The participants mentioned that “*feedback is an important tool for preventing digital media*”. This feedback can be based on monitoring performance and adherence to the set goals. The participants accepted that a moderator should have the authority and ability to access group-members digital usage and enact precautionary measures. Possibly, members would accept that this access is only from appointing the moderator, i.e. in the case of rotation based assignment policy. The moderator is expected to observe group members’ performance and progress and, based on that, make a judgment and send feedback and advice to the corresponding member. The moderator should also have the authority to take corrective measures if any member does not adhere to the group goals, e.g. “*lock some digital media application*”.

Moreover, it is acceptable for a group moderator to observe whether the group members achieve their goals. If any member struggles to achieve the goals, the moderator is expected to provide supportive information or “*amend the goals*”. Such amendments can be done through dialogue with users or by analysing their performance and profile.

Regarding how the moderator handles and makes use of the access to the digital usage of the group members, the moderator was expected to (a) make a judgment and (b) send feedback and advice on how to deal with addiction or guidance regarding the member’s performance. Some participants preferred the feedback to be “*strict, formal and in order*” and were in favour of a “*warning message*” if they exceeded the usage limit or use it in an inadequate context, e.g. during work hours. Moreover, participants mentioned that they preferred “*moderator feedback to be positive*”, such as “*Congratulations, but you will need to improve on this and that*”. The same participants had two different preferences, while others were clear in their specification. This suggests the importance of personality and contextual information around the feedback tone and timing.

Peer Feedback

The second viewpoint is peer feedback, and some participants accept online peer groups to allow peers to send feedback to other peers. They accept the peer feedback should about “*peer progress toward the goals*” or “*provide information to help users improve performance*”. Also, the feedback context should be motivational and has some encouragement tones that would persuade users to perform well and commit to the goals. A participant’s comments that “*I accept to receive feedback from peers but should be motivational and reinforcing the behaviour*”. Some participants also prefer positive and encouraging feedback from peers and concern about “*annoy and judgment feedback*”.

4.2.1.5 ACCEPTING ONLINE PEER SUPPORT GROUPS AS A DIGITAL ADDICTION SUPPORT TOOL

An essential factor motivating participants to accept an online peer group is the introduction as one of the “support tools” that will ease the DA prevention and recovery process. The participants accept joining a group that supports members to change their behaviour and attitude. The participants suggested three different kinds of support from the group, and they suggested three kinds of support: providing advice, emotional support and feedback support.

Provide advice

One of the factors which motivate user to accept and join an online peer group is advice. Some participants mentioned online peer group that should provide advice and help. They as well accept to receive advice from moderator, software and peer. Some participants recommended that the software be designed as intelligent, which can track users’ usage and access to the user profile and compare user progress with self-pass progress. Based on that, provide advice and strategies would help to follow and achieve the group goals. A participant suggested that “*the system should have an intelligent system that would provide advice 24 hours*” to help users have advice at any time. The interview also found that some participants suggested the moderator is the only person who can provide help and advice to the group members. Some participants accept the group moderator can access their goal achievement and monitoring system to judge user goals achievement and provide useful advice. Also, participants comment that “*the moderator should have the ability to compare peer goal achievement with other group members’ goals*” based on that “*provide advice and guidance*”. Moreover, some participants accept to receive help and advice from other peers. However, they prefer the peers should not be friends or relative, and they prefer the advice should be positive and motivational, and they reject to receive judgement from peers.

Emotion support

One of the essential factors to motivate participants to accept and join an online peer group is introducing support tools. Some of the participants recommended that the group provide

emotional support. The participant mentioned the group should offer non-judgement, guides, information and compassionate emotional support to users who are starting to change their behaviour. The participants recommended that the group moderator be professional and have the experience to create a comfortable environment where group members feel safe talking about things that most affect them when they reduce digital media usage. A participant recommended “the group should provide one to one emotional support”, and it was suggested the support could come from “group moderator or group members”.

Feedback

The third viewpoints are feedback which the participants considered as support tools to the online peer group. The feedback should support participants based on the monitoring goals, progress and performance; the participants have two preferences for the feedback. The first preference is that feedback should be positive, the participants accept to receive feedback from moderator and peer, and positive and motivational feedback is useful. The peer feedback required to be motivational by “sharing user stories and experience” also could be “has advice and guidance “, which helps to support other members emotionally. The participants recommended that the moderator feedback be more supportive by providing “guidance and structure” and could be “persuasive”, which helps members prevent DA. The second preference is that some participants recommended the feedback should be a warning and notify members of their usage level. The warning feedback process is suggested based on the monitoring system, the system or moderator should send a warning message to the user who accesses the “time limit of the goals” or “user spends a long time using digital media” some participants recommended the warning feedback should provide to the user who has “slow progress” which support them to know their level and they need additional help.

4.2.2 ONLINE PEER SUPPORT GROUPS TO COMBAT DA: REJECTION FACTORS

This section will present factors that would lead the users with DA towards rejecting an online peer support group. Figure 20 presents a summary of the rejection factors. These factors are detailed in the following paragraphs.

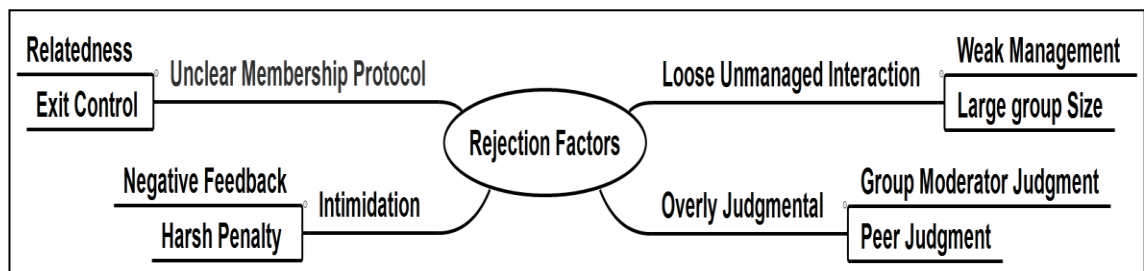


FIGURE 20: ONLINE PEER SUPPORT GROUPS TO COMBAT DIGITAL ADDICTION: REJECTION FACTORS

4.2.2.1 *REJECTING ONLINE PEER SUPPORT GROUPS WHEN SEEN AS AN INTIMIDATION TOOL*

Intimidation is one of the fundamental reasons for rejecting an online peer group platform. Participants have two viewpoints regarding rejection due to this reason; the harsh penalty and the negative feedback.

Harsh penalty

As anticipated by the participants, Penalties included “blocking from the group” and “writing member names on the main page of the platform as a loser”, even in a playful and gameful format. The harsh penalty seems to be affecting members “self-esteem or make members leave the group”. Some participants mentioned that harsh penalties mean a “threat” to them and that would affect their motivation to participate, truthfully, with the group and could lead to leaving the group or adopting workarounds such as using a secret device to access social media in a way that is not monitored by the online peer group software. They commented that “members join the group because they would like to control their digital usage, so they do not prefer to have a penalty”, as this seems to be against the free spirit of the membership and joining process. A participant stated that she “would not accept a harsh penalty even when I do not achieve the group goals”. This again shows the delicacy of implementing rewards and penalties for problematic behaviours and the conflict between users’ preferences, which necessitates consensus and commitment building when configuring the online per groups platforms and specifying their interaction and governance protocols.

Negative Feedback

Feedback is the process or task that helps group members learn their progress or get help and advice, and guidance on what they should do and how to achieve the group goals. Feedback plays an essential role in the online peer group as it can offer information that helps users improve their progress and ensure the user is on the right track.

Participants were much concerned regarding negative feedback messages received from group moderators or peers even if the feedback is factual such as "you compare less favourably to other peers". They prefer motivational feedback and reject the reception of a negative one. A participant commented that "some group members could not achieve the group goals for different reasons such as setting difficult goals or simply could not control usage", and that the feedback from a moderator or peers "should not be harmful" additional to what they have already felt and should not "underestimate the user". Overall, participants mentioned that harsh feedback could affect their feeling of membership and relatedness and affect their self-esteem, leading them to reject the group. They would prefer to receive a message that motivates and reinforces them to reduce

their problem. Having critical feedback is different from negative feedback, and it seems it is a matter of framing and language problem here. Participants did not like the highly serious feedback as although they view DA as a real problem; they reject framing it as a formal addiction; "I do not like to receive a message that says that using digital media for a long-time lead to a mental health problem such as depression". Besides building census and commitment, denial and trivialisation of issues are common attitudes of people with problematic behaviour. They need to be dealt with when configuration and starting online peer groups.

4.2.2.2 *REJECTING ONLINE PEER SUPPORT GROUPS WHEN SEEN AS OVERLY JUDGMENTAL*

Participants tend to refuse to be judged by others in the group, especially when the judgment is coming from peer and automated software. The situation can lead to a more complex reaction when peers know each other in person as the judgment will expand to the real personality. A participant mentioned that "if the group members are my friends, maybe if I meet them, they will judge me through my digital media usage". Also, participants did not prefer receiving feedback in the form of questions such as "why you are always on Facebook". The main reason for the participants to reject online peer groups is that they all have different usage styles and intentions regarding social media. This observation is an important parameter, which appears that software and peers cannot merely judge it. Although less of a concern, participants also had a problem being overly judged by the group moderator. While they tended to accept feedback from the moderator in general, they preferred that the feedback include advice or guidance regarding their usage, rather than pure judgment messages. For example, a participant commented that "sometimes the group goals are too hard and I could not achieve the goal". In this sense, moderators should send feedback to support them and show them strategies rather than sending scores and judgements.

4.2.2.3 *REJECTING ONLINE PEER SUPPORTS GROUP WHEN HOSTING UNMANAGED INTERACTIONS*

Participants prefer the group interaction to be run and overseen by the group moderator. They had two viewpoints to reject a group in that regard; (a) if it has weak management and (b) if it is a large size, management is complex. Participants would reject a group with a weak moderator who cannot decide, such as banning members who are not adhering to the group norms, e.g. in the conversations and sending warning messages. Participants prefer a group moderator who can "control the group connections and oversee messages sent by members". They were concerned about weak management that is unable to stop members annoying others by sending feedback against the "group aims" such as "friendship requests", or "jokes". The participants preferred that the moderator shall be able to delete any message that does not follow the group aim and send a "warning message". A participant mentioned: "I joined the group because I would like to control

my digital media usage and I do not want to receive any friend request from the group members” and the group moderator “*has to warn any member who sends a friend request”*.”

The other reason to reject an online peer group is its large size. The participants expressed concerns regarding group size and feared that its management is “*difficult*” if it is a large one. Specifically, some participants preferred the group size to be minor, i.e. from five to ten members. They argued that a big group would be “*massive and do not help to achieve the group goals*”. Furthermore, a large group would be “*annoying and would receive many messages*”, meaning that members could not focus on the group goals. Also, they argued that, in a large group, it “*is not easy to track all members and the competition in a small group would make more sense*”.

4.2.2.4 REJECTING ONLINE PEER GROUPS DUE TO UNCLEAR MEMBERSHIP PROTOCOL

Participants expressed concerns regarding (a) relatedness of group members and (b) conditions to exit from the group. Some of the participants rejected joining a group whose group members are friends or relatives. Some of the participants prefer to join a group with people who do not know each other as that would “*make members feel more comfortable and confident*”, and they would then accept to “*share usage, comments, and feedback with peers*” because they know “*no one would judge [them] in real life*”. Other participants preferred to join a group of people known to each other. However, they prefer to be “*semi-anonymous*” and reject to provide their “*real name and picture*” when it comes to monitoring usages. This can be solved through messages like one of your friends is having difficulty with games today; what do you like to tell them? Participants agreed that a group of friends “*make them trust the group, and they will not worry about privacy*” as they already know that their usage is problematic. It can be noted here that participants had a paradox between trust and privacy here.

Participants rejected that the group could have conditions or regulation regarding the exit from the group because that would affect “*members feeling*” and that “*they will feel stress that the group control their freedom*”. Participants generally agreed that they should be free to leave the group whenever they like. However, they would not approve a “*member leaving the group without giving notice and explanation of why they decide to leave the group*”. They suggested that when somebody leaves a group, they should invite somebody else to join, especially when the “*group size is small*” and when leaving may adversely “*affect the morale of members to achieve the group aims*”. Again, we can note the conflicting preferences requiring a resolution process.

4.2 DISCUSSION

Determining the factors which affect the acceptance and rejection factors to the online peer group would increase the acceptance, especially to the people who have problematic behaviour. In certain findings, some contradicted and distinguished preferences (see Table 10) that require

studying the conflict preferences. Also, we note some acceptance factors and rejection factors connected and related to each other, and we cannot eliminate the rejection factors as summarised in Table 11. Therefore, the configuration of online peer support groups would need an argumentation and negotiation process to get agreement among participants. It seems there are three major conflict in the acceptance perspective of the online peer group, which would need to be handle in further study:

- *Entertainment tools (peer comparison) vs Awareness tool (peer comparison)*. In the entertainment tool, the participants prefer the group to be fun by comparing their performance and progress with other members who have a similar type and level of addiction and a similar performance and goal achievement level. The participants mentioned comparing their progress and achievement with peers who have a higher level of goal progress or performance would harm them and affect their confidence and self-esteem (Von Bergen et al., 1996, Vogel et al., 2014). However, at the same time, the participants require and recommend comparing their progress with peers who have similar occupation or interest. The participants thought that comparing performance and achievement with peers at a different level of performance would raise awareness of the problematic behaviour. The conflict is in the awareness peer comparison tool the participants prefer to be compared with peers who have different goals progress. Still, in the entertainment peer comparison, the participants do not prefer to be compared with peers who have higher progress.
- *Awareness tool (Achievement tool) vs entertainment tool (Goal achievement)*. In the awareness tool, the participants agreed that goal achievement would help raise awareness, and group members would recognise the problem of self-control in digital media. Moreover, the participants mentioned that peers who cannot achieve the goals or find the goals complex and difficult would help raise member awareness of digital media usage problem. However, in the entertainment tool, the participants recommend that the group set an achievable goal to improve the users' performance. The participants raise concerns about complex and challenging goals; they argued that complex goals are not easy to achieve and could affect members' self-esteem and feeling. The conflict is in the acceptance factors, i.e. in the entertainment tool, the participants are concerned about the complexity and difficulty level of the goals, and in the awareness tool, the participants mentioned users who cannot achieve the group goals that would raise awareness about the problem of self-control digital media usage.
- *Prevention tools (moderator feedback) and support tools (provide advice) vs support tools (emotional support)*. In the prevention tools, the participants agreed that the moderator could provide feedback based on the user's progress and performance. The participants agreed the moderator feedback could be judgemental, motivational and strict.

Also, in the support tool feedback, the participants accept that the moderator can access their progress and, based on that, provide feedback that could be guidance or judgemental. However, in the support tools, the participants mentioned they do not prefer anyone to judge them. They do not accept the moderator to send any judgemental feedback because that would affect their emotion. The participants accept the moderator to make a judgement based on their performance and provide feedback and advice. However, simultaneously in the emotional support tools, the participants do not prefer anyone to judge their performance, and they thought judgemental feedback would affect their emotion and self-esteem.

The following section showed the rejection factors that should be tolerated in the design of an online peer group because if we eliminate them without enough consideration of the side effects of doing that, the group can lose its main purpose. Also, we need to study the effect of keeping the rejection factors to some of the acceptance factors.

- *Entertainment tools (award) vs intimidation (penalty)*: Participants accept that the online peer group should be introduced as entertainment tools. They would like the group to have some fun, such as providing an award. At the same time, some of the participants who agreed the group should have rewards rejected penalty and consider it an intimidation tool, which could lead to withdrawal from the online system (Consolvo et al., 2009a). However, the award itself would not make the group fun and have competition, but award and penalty together would help achieve fun and entertainment in the group. It would also encourage users to achieve group goals and be aware of their progress, whether good or slow. Some aspects of acceptance and rejection preferences are not about individual preference; it is about the group's commitment. Also, in the design stage, some of the participants' rejection requirements should not be followed because some of the rejection factors are useful. This would be a case for further study by covering a large sample of participants to determine (i) the number of participants who reject penalty and (ii) what type of award and penalty accepted are considered fun and entertaining. The healthier requirement here is that the participants want to be rewarded only and not be penalised in any way. This is not in line with 'operant conditioning', which involves issuing rewards to users who adhere to the goals and penalise those who violate them (Pinder et al., 2018).
- *Democracy vs intimidate tools (harsh penalty)*: The participants accept the group should be managed by the group moderator. At the same time, they required the management to be a democracy, and members should not be forced to leave the group. However, at the same time, some participants who preferred group democracy rejected weak management and required the moderator to have the ability to ban members who do not adhere to the group rules or do not achieve any goal progress. For example, ban members who disrupt other members by sending annoying messages or feedback. A weak moderator might

sway users to leave the group, especially those who are rule-abiding. Therefore, a moderator should intervene and implement the required measures when users broke the group's rules (Alrobai et al., 2016b). Also, some participants reject harsh penalties such as banning members temporarily or permanently, but at the same participants reject weak management and require that the moderator provide harsh penalties to members who do not achieve any progress or disrupt other members. In this case, the democracy moderator and weak moderator are conflict requirements; hence a negotiation and argumentation process is still worthy of further work.

- *Supportive tools vs judgmental paradox*: The participants accept the online peer group as a supportive tool supporting users by sending feedback to guide or motivate them to achieve the group goals. At the same time, some of the participants reject negative and judgmental feedback, and they think it would affect the users' self-esteem and might affect their decision to leave the group. This is in line with the study by (Young, 2000), in which participants pointed out that it was more likely that students with low self-esteem would feel defeated by feedback and consider leaving their course. However, the design of a useful peer group should consider having judgmental and harsh feedback, especially for the users who have low progress or those who disrupt other group members by sending messages not related to the group aims. Also, some judgmental and harsh feedback helps users be aware of the problem and recognise when their progress is slow. The interviews indicated that some of the requirements could not be implemented; for example, the participants reject overly judgmental feedback. However, at the same time, they want the moderator to give some judgmental feedback which could help members to be aware of their problems.
- *Membership vs authority to access data paradox*: The interviews also showed that some participants were concerned about privacy and membership. They accept that the group members can be strangers, and they reject to join a group with relative or friend's membership. This is in line with the study by (Consolvo et al., 2009a), where some participants preferred to set goals within a group with total strangers. Also, some participants accept sharing goal achievement, usage, comparing progress with other members, and receiving feedback regarding their usage, which would affect trust between members because users cannot share their information with strangers. There is conflict in that requirement because joining a group with strangers would affect trust and privacy because it will not be easy to share knowledge and information with strangers.
- *Peer learning vs unclear membership*: The participants accept that the online peer group should enable members to learn from one another. These can be achieved by enabling them to share stories, knowledge and experience within the group. Although the participants accept to share such information, at the same time, they prefer the group members to be strangers. Sharing information with strangers would affect trust as

members might be sceptical about sharing their stories and experiences with strangers. Also, with peer learning, there may be the possibility of misinformation which might be challenging to identify if there is a rota moderator as they might not have the experience and knowledge to do so. Additionally, the personality of group members might affect their receptiveness to the information shared within the group. There is conflict in that requirement because being in a group with strangers would affect the trust between members because it will not be easy to share certain information with members whom one regard as strangers.

- *Peer comparison vs unclear membership*: The participants would accept to compare their goal achievement with other group members, but at the same time, some participants preferred to be compared with total strangers. Comparing with strangers will affect the level of trust between group members, and it might be challenging to compare performance and achievement with other members who are strangers.
- *Peer comparison vs overly judgemental*: The participants accept to compare their goal achievement with other group members, but at the same time, some participants reject to receive any negative, harsh or judgmental feedback regarding their performance or interaction with other members.

The interview findings showed that some requirements are not compatible and cannot be put together, and some of the requirement cannot be applied unless a reconciliation, conflict resolution and additional countermeasures are performed.

- *Moderator role and Authority access data*: The participants required that the moderator should be rotated between group members. They required the moderator to manage the group and provide rewards and penalty, such as banning members who do not adhere to the group goals. At the same time, they required the group to have a high level of privacy and not allow any member to access their goals, performance and interactions. This requirement is not compatible because when the moderator is rotated between group members, the moderator cannot ban members or provide a penalty. The moderator should also not have access to the users' usage and provide feedback because this is against privacy. Furthermore, when the moderator is rota-based, the moderator should not be able to delete messages that are not in line with the group aims or detect disruptive members. At the same time, the moderator should not be able to send a warning message to the user who has low progress that would be against the group privacy.
- *Peer comparison*: The participants consider peer comparison to being entertaining and fun, which would help motivate users to change their behaviour. However, some participants prefer to compare their progress with other members, but they prefer other members not to compare their usage. This requirement is not compatible because when a member compares their usage with other members, they would expect to compare their

usage. This could emotionally affect those members who cannot compare their usage with other members. Central to why people develop negative digital behaviour is peer comparisons, i.e. how people perceived themselves in contrast to others. For example, when a user thinks that their peers have a better life than they do, based on the information they see about their peers online.

- *Peer feedback (authority)*: The participants require the online peer group to have a feedback feature that would help them be aware of their goal performance. At the same time, the participants prefer to have privacy within the group. Some participants required the online system to be designed so that group members would not have access to each other's goal performance and achievement information. They required members to provide feedback based on users' goal performance and goal progress. The key goal of providing feedback is to allow users to oversee their behaviour by using feedback on their past and present usage or behaviour (Orji et al., 2019). Without knowledge of such information, there is accessibility and authority to access usage information conflict here because one cannot provide feedback without having access to performance information.
- *Self-awareness feedback*: Participants accept to have a monitoring system to enable the group to track and monitor their usage or behaviour and provide feedback to group members. Some participants preferred the system to provide only positive feedback; they do not like to receive any warning or negative feedback; at the same time, they prefer the system to raise their usage awareness by sending popup warning feedback messages. However, they are worried about how often the messages are sent. A conflict would be the feedback style, e.g. presentation and delivery of the messages, i.e. if it obstructs or distracts users' present tasks and the framing of the feedback, i.e. whether the messages are gain or loss-framed (Lim and Noh, 2017). Also, the messages' presentation and delivery would conflict if the moderator provides the feedback because they would not be aware of members' preferred frequency of delivery.
- *Peer comparison and feedback*: The participants would accept to compare their goal progress with their peers, and they agreed that comparing goal performance and achievement level would be useful. At the same time, some of them prefer not to receive any form of negative feedback concerning their goal progress. Feedback messages can be gained or loss framed. The design of an effective online peer group should consider implementing negative feedback messaging. There is a conflict in this requirement because one cannot expect to receive only positive feedback even when their goal performance is below expectation. When this is the case, it might be useful for the members to be provided with negative feedback. After all, this can be a wake-up call for some.

TABLE 10: CONFLICTED REQUIREMENTS

Theme	Description
Entertainment tools (peer comparison) vs. Awareness tool (peer comparison)	The participants prefer to compare their performance and progress with other members who have a similar level of addiction and a similar level of performance and goal achievement in the entertainment tool. However, the conflict in acceptance requirements is in the awareness tools. The participants recommend that the comparison be with peers who share similar addiction levels and share similar interests or occupations. They thought that comparing performance and achievement with peers at a different level of performance would not raise awareness.
Awareness tool (Achievement tool) vs. entertainment tool (Goal achievement).	In the awareness tool, the participants mentioned goal achievement would help raise members' awareness. If peers cannot achieve the goals or find it complex and challenging, this may help raise member awareness of having problem in the self-control digital media. However, the conflict is in the entertainment tool; the participants are concerned about the complex and challenging goals. They mentioned that complex goals are not easy to achieve and could affect member self-esteem.
Prevention tools (moderator feedback) and support tools (provide advice) vs. support tools (emotional support)	The participants accept the moderator to make a judgment based on their performance and provide feedback and advice; also, they accept the moderator to provide strict and order feedback. However, the conflict is in the support tools, the participants do not prefer anyone to judge their performance, and they thought judgemental feedback would affect their emotion and self-esteem.

TABLE 11: CONFLICTS IN ACCEPTANCE AND REJECTION VIEWPOINTS

Theme	Potential conflict	Brief description
Comparison vs. feedback	Feedback framing	The study findings showed both comparison and feedback as acceptance factors. Having two acceptance factors together indicate that there is a conflict in the requirements and if such conflict is not handled, the users could reject one or both acceptance factors. Here, the conflict relates to participants preferences of feedback framing, i.e. the loss framing of the feedback messages. If this framing issue is not taken care of, then feedback as an acceptance will be affected.
Exit control (<i>Democracy</i>) vs <i>weak moderator management</i>	Weak management style Exit control	Here, the two themes are rejection factors and if one is not taken care of before the design of the online group because if both are kept, then more difficulty will be faced. For example, suppose exit control is not handled or adequately implemented. In that case, this could worsen the weak moderator management factor because a weak moderator might not control members from leaving the group. A weak moderator may be why members leave the group.
Peer comparison vs unclear membership (relatedness)	Trust issues	Unclear membership is a rejection factor that can adversely affect the acceptance factor, which is peer comparison. So unclear membership should be handled in the online peer group's design; otherwise, peer comparison could be rejected by the users. For example, comparing with strangers will affect the level of trust between group members. It might be challenging to compare performance and achievement with total strangers, and some users may be unwilling to do this.

Peer comparison vs overly judgmental	Style feedback and being overly judgemental	Here, there is one acceptance factor, i.e. peer comparison and one rejection factor, i.e. overly judgemental. If the rejection factor is not handled before designing the online peer group, then the acceptance factor could be affected, i.e. it can be rejected by users. For example, if some peers are overly judgemental when comparing their performance, others can opt-out of this performance comparison option.
Self-awareness vs feedback	Presentation and delivery of messages Conflict if feedback is coming from moderator Feedback style	Both self-awareness and feedback are acceptance factors. This means that these factors are in conflict, and if such conflict is not taken care of, they will not be acceptance factors anymore. Some participants preferred to receive positive feedback; they do not like to receive any warning or negative feedback. At the same time, they prefer the system to raise their usage awareness by sending feedback. If users do not react well to the feedback, they may not learn anything from the messages, and their awareness would not be raised. So the conflict is in the framing of the feedback and the presentation and delivery of the messages.
Peer learning vs unclear membership (relatedness)	Rota moderator - level of experience and knowledge	Unclear membership as a rejection factor can affect the acceptance factor, which is peer learning if it is not handled before the online peer group's design. It could affect people's readiness to learn from each other, e.g. share stories, knowledge and experience with other group members. This is because unclear membership would affect trust as members may not be comfortable sharing their story and experience with total strangers.

Reward vs. penalty	Penalties should be given if group rules are not followed	The reward is an acceptance factor that can be affected if penalty as a rejection factor is not handled. Some participants mentioned that they reject penalty, especially for members who are disruptors and disagreed that the group members should be penalised based on the achievement of their goals. It is essential to issue penalties if the group rules are not adhered to and if member goal performance is low.
<i>Authority (Moderator Democracy) vs harsh penalty</i>	Cannot have democracy without punishment	The participants accept that a moderator should manage the group at the same time they preferred to have democracy within the group setting so that members cannot be forced to leave the group. Some participants who preferred to have democracy rejected weak management and would like the moderator to have the power to ban members who are not following the group rules or who do not achieve any goal progress as democracy cannot be properly implemented if there are no consequences for rule violators, e.g. being penalised for issuing negative feedback.
Peer feedback, Authority (authority for access data)	Accessibility rights Authority	Here, peer feedback and authority for access data are both acceptance factors, and there is a conflict if there are two acceptance factors. Participants required that the group should have privacy. For example, some participants required the group design not to allow any group members to access their performance and goal achievements. In contrast, they required that peers provide feedback based on user performance and goal achievements. The conflict relates to data access right between peers.
Support tool conflict with overly judgmental	Negative feedback and not judgemental	Overly judgemental is a rejection factor that can affect the support tool, which is an acceptance factor if it is not handled before the system design. One of the online peer group's purposes is to provide support to members by sending feedback messages. Participants required the moderator to provide feedback

		regarding their performance and goal achievements. If some participants required the feedback to be positive and reject negative or judgmental feedback regarding their performance or interaction, the support tool's goal would diminish.
<i>Membership vs. Authority to access data paradox</i>	Trust Privacy	Here, both are acceptance factors, and when this is the case, there is a conflict of requirements that need to be handled. For example, participants who prefer group membership should have no previous ties with each other. However, there is conflict because this would affect the trust between members since people usually do not trust strangers and would prefer not to compare their performance and share goals and goal achievements with strangers.
<i>Moderator role vs. Authority access data paradox</i>	Access right	Both moderator role and authority access are acceptance factors, and when this is the case, there is conflict. The conflict between these factors is 'access right and privacy'. For example, some participants required the moderator role to be based on a rota between them. Still, there is conflict in the acceptance factors such as privacy, and the moderator should not have access to group members' performance. The moderator should not have the ability to provide feedback, reward, and penalty based on goal achievement member interaction.
<i>Peer comparison not compatible requirement</i>	Emotional issues Self-efficacy	Some participants would prefer to compare their usage with other members to know their performance while rejecting others to compare their usage. This requirement is not compatible because when a member compares their usage with other members, they would expect to compare their usage. This could emotionally affect those members who cannot compare their usage with other members.

4.3 CHAPTER SUMMARY

This chapter explored the factors that affect the acceptance and rejections of people with DA regarding online peer support groups for combating their DA. A range of factors seems to be conflicting. For example, while people like the group to provide a friendly environment where game elements are used, e.g. regarding challenging each other regarding reduction time, they like not to be monitored and judged. Similarly, while they appreciate the freedom to join and leave, they were concerned that this might affect their members and lead to trivialising the process.

5. CHAPTER 5: VARIOUS FACETS OF ONLINE PEER GROUPS

This chapter explores the various spaces of online peer group design for people who have problematic behaviour. This includes the interview analysis and various users' preference and viewpoints of design the online peer group.

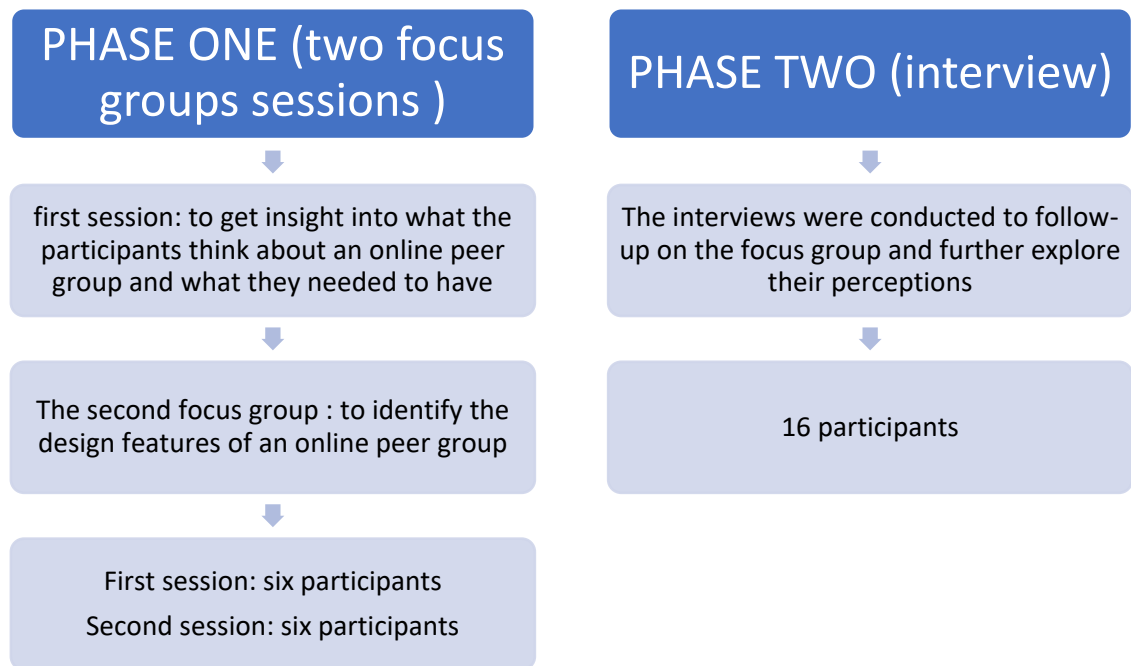
Recent years have seen growing interest in academic research, market and clinical to develop smartphone applications to deliver behaviour intervention for health and problematic behaviour. Even though the grouping availability of health-related apps, there is still limited research on how technology-assisted behaviour change should be engineered. The majority of the available mobile apps for behaviour change are not developed by health professionals or academic, do not involve behaviour change theories or technique (Cowan et al., 2013, Chomutare et al., 2011a, Chomutare et al., 2011b). Also, there is a lack of research on users' (and potential user's) exploration of preferences, views, and software requirements or mobile application to help users change behaviour (Dennison et al., 2013). This chapter will attempt to achieve objective three by exploring various factors of online peer group platform design to accommodate different users' preferences.

5.1 RESEARCH METHOD

This chapter followed a qualitative method to explore the various spaces of design online peer group of people with problematic behaviour to change their behaviour. We collected and utilised data from two studies to increase the credibility and coverage of the findings. In the first study, we performed a secondary analysis of a focus group study of two sessions. The first focus group session aimed to get insight into what the participants think about an online peer group and what they needed to have in it. The second focus group served the purpose of identifying the design features of an online peer group [see Table 7](#).

For this reason, mock design interfaces made based on the result of the first focus group were built and presented. The participants were asked about opinions regarding the mock design. The two focus group sessions were conducted with the same six participants, three male and three females, aged between 20 and 26. Participants were selected because they identified themselves as persons who are having a problematic use of social networks. Some of the participants can be considered friends. Though this has some effects on the study, it is also beneficial because concerns regarding trust and privacy during the discussion process are suppressed in more details, see section 4.2. The secondary analysis of the data collected from these focus groups was performed using thematic analysis (Braun and Clarke, 2006). This analysis revealed the main factors concerning the variability factors of the design of the online peer group. The findings were used to construct the interview protocol for the primary study and provided a starting template for its analysis.

In the second study, an interview study was undertaken in order to elaborate further on these aspects. The interview was conducted with 16 students self-declaring to experience problematic online services, e.g., obsessive or compulsive use, eight males and eight females, aged between 18 and 35. Each interview lasted between 30 and 40 minutes; for more details, see section 4.2. The interview questions revolved around the acceptance and rejection factors discovered in the first phase and the design features that would support a desired operation of the online peer support group. The interviews were transcribed and analysed via thematic analysis, which is considered one of the most common method of analysis in qualitative research. In 2006, (Braun and Clarke) published an article that described how to use a thematic analysis step by step. The analysis explored different design variability aspects of the online peer group.



5.2 RESULTS

The purpose of the interview is to explore the variability space of online peer group platforms' design to accommodate different users' preferences. The analysis showed the participants' recommended three aspects that should be included in the design of online peer groups: moderator, functional governance and non-functional governance. The participants recommended various preferences for designing these factors and features. The participants highlighted the importance of having human moderators in the online peer groups to motivate members to *commit to group goals and trust the group*. *The analysis also indicated the significant factors of online design groups: functional and non-functional governance, which help determine the different users' preferences of governance that the group features*. For example, governance of the user preference of setting members' goals, the reinforcement of functional systems and consideration of the variability of the design preference to provide reinforcement functions.

5.2.1 GROUP MODERATOR

The interview analysis showed that the moderator aspect is one of the main issues mentioned by participants. Participants have two preferences of group style. Some of the participants preferred the liberal style, but others wanted a more directed style. The first preference is about the maturity of members and the shared knowledge between them, making the moderator factor a part of their self-regulation. They also accepted that the moderator role could be rotated, and they accept that the group moderator could be an expert at the beginning of the group. After a while, the moderator could leave the group and allocate a moderator from the group members. The second preference prefers a directed group governance style - their argument stemmed from eliminating unhealthy conversations and interactions between the group members and maintaining focus in-group goals. The interview findings showed that participants suggested various moderator features and different preferences to the moderator features, which they also suggested should include the online peer group - see Figures 21 and 22. The interview indicated that the participants recommended various design preferences of moderator tasks, how to allocate moderators, and the moderator's skills and authority.

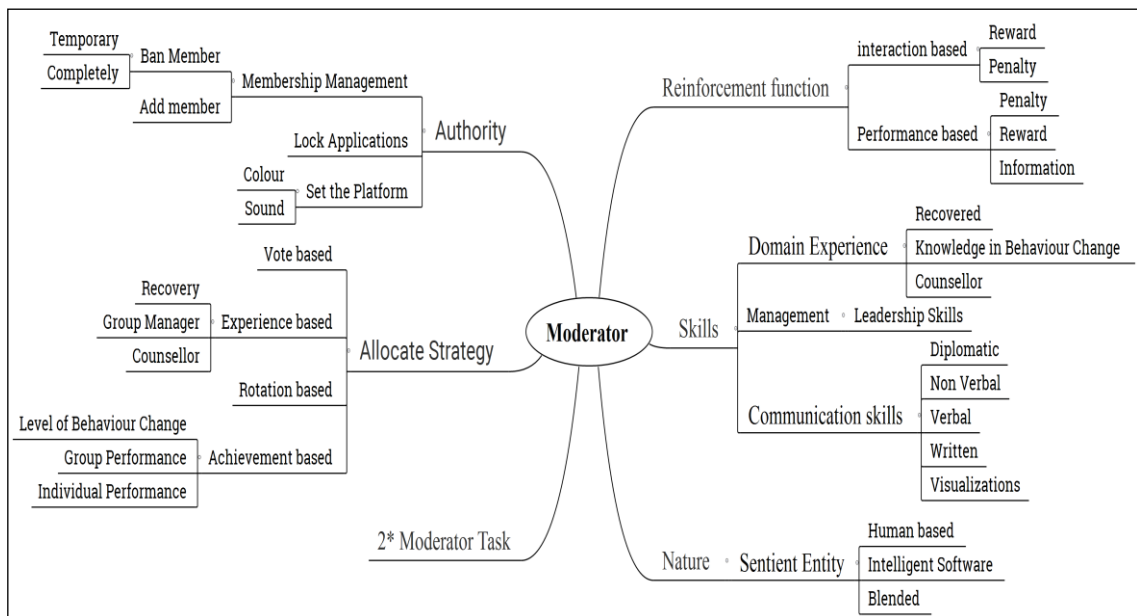


FIGURE 21: MODERATOR FEATURES

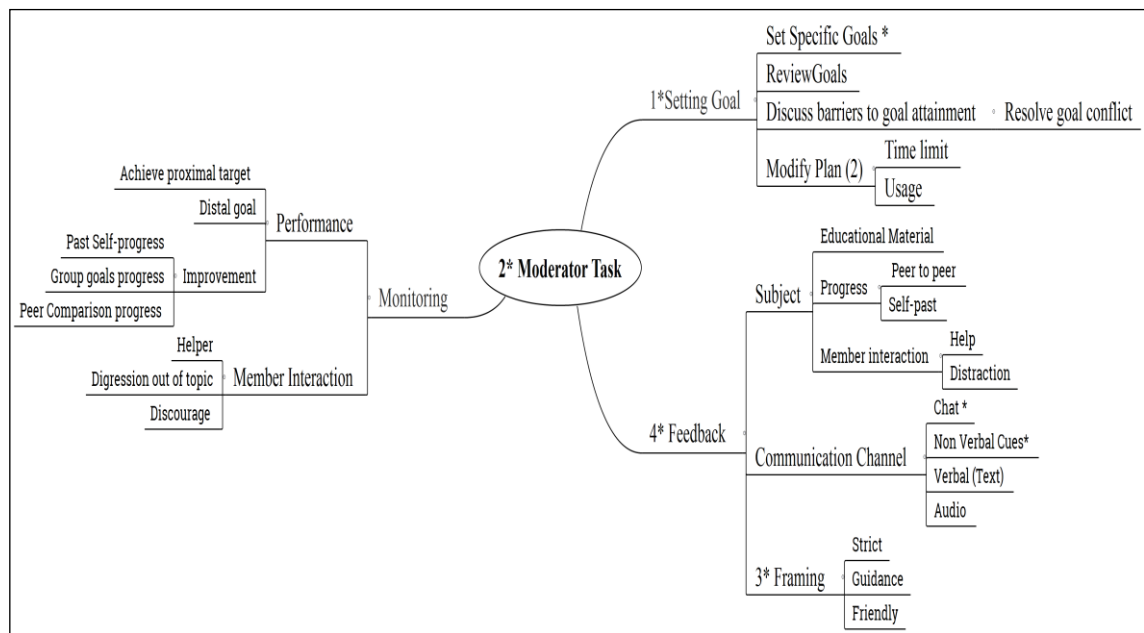


FIGURE 22: MODERATOR TASKS

5.2.1.1 MODERATOR TASKS

The group moderator is considered one of the essential factors in running and managing the online peer group. The way to manage the group could affect the group's success. There are different group management styles, and the moderator could follow the suitable style to manage the group, such as autocratic, persuasive, consultative or participative of management. The group moderator has various tasks to run and manage the group. The interview indicated that the participants recommended the moderator tasks' variability features, and they suggested various preferences and opinions. The participants suggested different preferences to the moderator tasks: sending feedback messages, setting goals, and monitoring group members' performance and interaction.

Feedback task

Moderators have various tasks within the online peer group. One of the useful tasks is to send a feedback message to the group members. This suggests that the moderator should employ a moderation role similar to the active moderation approach of the transactional leadership paradigm (Bono and Judge, 2004). It appears that moderator feedback is considered one of the most powerful features used to positively impact members' achievements, group aims and educate users on how to control and change their behaviour. The interview analysis showed that participants suggested various design requirements of moderator feedback; also, they recommended several features to moderator feedback which included reason and subject of the feedback, communication channels and feedback framing. However, participants also had various design features and requirements of the moderator feedback on the online peer group and various opinions and suggestions.

Participants felt that one of the group moderators' essential tasks is to send feedback to the group members; they suggested that the feedback should have aims and reasons. The interview analysis indicated that participants recommended various opinions about the feedback's reasons and subject. The first opinion is that moderator feedback should have educational material to help members learn from the moderator knowledge. The interview showed that some participants preferred to join the group to learn how to change and control their behaviour; they thought that moderator feedback is an essential factor that would help to learn. Some participants felt that members could learn from moderator feedback that includes guidance, advice, and strategies to control their behaviour and achieve the group's goals. A participant commented that "*moderators should monitor group member's usage and behaviour, then send guidance and instructional feedback depending on the member's situation*" which would help members learn how to control and change their behaviour.

The second opinion suggested that moderator feedback should be about peer progress. The interview showed that the participants have two preferences of progress feedback; some of the participants felt that the group moderator should send feedback to the group members based on "*self-past progress*". The participants recommended that the moderator feedback be based on comparing the member's current progress with their past progress. They argued that self-past feedback helps the user recognise the benefit of the peer group and level of control and change the target behaviour. A participant commented that "*moderator feedback should compare current performance and past-performance which would help to know the progress and encourage achieving the usage goals*".

The other preference of moderator progress feedback is that some participants recommended that the moderator feedback be based on "compare peer progress with a specific peer" related to them or with a peer who has a similar profile. They argue that peer-to-peer progress feedback would help them know their progress level and identify if their progress is good or if they need to work more to achieve the group goals. This kind of feedback is also useful and more effective because it would help members understand their progress and compare themselves with a specific peer, which would help encourage a user to achieve the group goals and change their usage behaviour. A participant mentioned that "*I feel moderator have to send feedback regarding comparing my goal progress with other peer members' progress, which would help me to see if he or she has used less and progress well; then I can feel okay, I'm using more, and my goals progress is low, so I'm wasting more time*".

On the other hand, participants felt that the moderator feedback is about user performance and progress; they recommended that the feedback involve members' interaction. The last opinion regarding moderator feedback is that it should be about peer interaction, and some of the participants prefer that the moderator can monitor group member interactions. Some participants recommended that the moderator have to send warning feedback to users who distract other group

members. For example, a participant mentioned that “*moderators should send a warning message to a user who sends a message outside the group topic or friendship request*”. Furthermore, some of the participants recommended that the moderator send “*thankful feedback*” to users who help other members by advising them or sharing their experience in behaviour change.

Participants felt that moderator feedback should persuade group members to change their behaviour, so the feedback message should be appropriately framed. Framing the right feedback could strongly influence group members to adhere to moderator guidelines and advice. Participants mentioned two types of framing in which a positive frame entails a member obtaining a gain or avoiding a loss by achieving the group target. In contrast, a negative frame involves forgoing or experiencing a loss to stop following the group goals and leave the group (Locke, 1996). These two approaches to feedback framing are explained in detail in (O’Keefe and Jensen, 2011). Participants recommended that moderator feedback follow a positive frame to persuade members to achieve the group goals. They recommended various opinions and suggestions of the moderator feedback message frame. This finding is in line with (Krenn et al., 2013) study results, where those who received positive feedback had a better goal performance than those who had negative feedback. The first opinions recommended that the feedback be “*an order and gaudiness*” because they thought instructional feedback is more powerful than feedback information. A participant commented that “*I prefer to receive instructional feedback from the moderator; the feedback should sometimes have some instruction and commands of how to achieve the goals*”.

Feedback moderator tone is important when delivering peer assessment and provides useful information about how to change behaviour and strategies to achieve the group goals. The second opinion of the feedback framing is the feedback tone; the interview indicated that some of the participants suggested various suggestions of the feedback tone. Initially, they suggested that the feedback tone should be “*strict and more formal*”. In their opinion, strict feedback should be more effective and forced to follow the moderator guide and advice. The other participants recommended that the moderator feedback tone be “*serious and formal*”; they prefer that the moderator feedback should not have humour because humorous feedback could lead to misinterpretation and make it seem less important than it is. A different suggestion recommended by some of the participants is that the moderator feedback should be considered “*a continuum of instruction and should be clear instruction*” related to the user process and tasks that would help to know the next target. The last suggested the participants prefer the feedback should have influence tone either “*positive or motivational*”.

The interview analysis showed that some of the participants recommended that the moderator feedback should be “*positive*”, which would help to “*persuade members to achieve the group goals*” and would “*influence members on to achieve their proximal target*”. Besides, some

participants prefer moderator feedback to motivate users to change their behaviour by achieving the distal target. For example, a participant commented that *“positive and motivational feedback would encourage members to adhere to the group goals and could motivate them to achieve group targets”*.

It is important to determine the types of feedback communication between moderator and group members. Participants have variabilities preferences of the design requirement on the moderator feedback that they receive. Participants suggested different communication preferences and moderator feedback, such as receiving feedback as pop-up text messages or in chatrooms, whether audio or text.

Some participants' first feedback communication preference required the moderator feedback that should be delivered in a chatroom. They have two opinions about the kind of chat.

- The first opinion is that the chatroom should be designed to send the feedback as audio, which would improve the quality of the feedback and reduce the amount of time spent online by the moderator and users (King et al., 2008). A participant mentioned that *“I do not prefer to read a long text. Also, the feedback voice tone is more effective, and when explaining the feeling of the user and moderator, voice tone is more effective and could explain their emotion”*. Also, Cavanaugh and (Cavanaugh and Song, 2014) showed that students positively react to receiving audio feedback.
- The second design preference of chatroom communication is that some participants prefer the feedback sent as a text message because *“written feedback is permanent and easy to understand”*. Also, they mentioned that written feedback is a more reliable way of communication and more flexible, which allows moderators to choose the language of the feedback, such as persuading or encouraging statements (Weaver, 2006).

Additionally, the interview indicated that the participants felt it is essential to determine the number of users that would join the chatroom. The participants have two viewpoints regarding how many users should join the chatroom and listen to the feedback.

- The first viewpoint is that some participants prefer that the chatroom has a high level of privacy, and they recommend that the chatroom be designed to be a “one to one room” where the feedback should be between members and moderator and “peer to peer”. A participant commented that *“one to one feedback is more effective and allows the moderator to discuss their progress in a private environment without concern of any members who could know their progress”*.
- The second viewpoint is the opposite of the first viewpoint. Some of the participants preferred that the chatroom be designed to allow all group members to join and read or listen to the moderator’s feedback and other group members’ discussions. Participants argued that *“knowing other members’ feedback would help everyone learn from the*

advice and guidance” delivered to the moderator. A participant commented that *“moderator deliver user feedback in front of group members is useful and more effective, enabling peers to learn from other feedback and avoid other mistakes”*.

The participants suggested different types of feedback communication; the second preference is mentioned by some of the participants who prefer that the communication feedback is non-verbal cues. Some participants preferred that the moderator feedback should include non-verbal cues such as emoji’s or that the platform colour depended on member progress or goals achieved. Non-verbal feedback has a transient expression of the feedback; the message received is swift and easy to present. For example, a participant suggested that different colours could represent the platform colour to indicate user progress, such as: *“green means doing well, yellow means you are close to exceeding the goal limit, and red means you have exceeded the goals”*.

Most of the participants preferred moderator feedback to be in writing and send as a report which includes more *“details about progress and goals achieved”*. The interview analysis indicated two different requirements for designing the frequency and time of the written feedback provided by the moderator. The first requirements are that some participants recommended the platform should be designed to allow the user to customise the time of receiving moderator feedback, for example, *“the moderator provides the feedback daily or weekly”*, and the user can customise *“feedback time such as in the morning, evening or weekend”*.

The second requirements recommended that the platform is designed to allow the moderator to deliver the feedback in real-time. However, they have two opinions regarding delivering the feedback message, whether the following push or pull approaches.

- Some of the participants required that the software should be following the pull approached, which does not require the member to check their status as it is delivered automatically when the user exceeds the goals limit. However, they were concerned about the *“frequency and time of delivery of the feedback”*. They recommended that the platform be designed to allow the members to *“customise the time and frequency of the feedback”*.
- The other opinion recommended that the feedback be designed as a push approach that triggers the user to check their status, allowing them to know their progress and the target achieved.

Goal Setting

Goal setting is the most significant aspect of designed online peer groups and considered as one of the important factors to motivate members to improve their performance in the group and encourage changing the target behaviour. The interview showed that the participants highlighted the importance of setting goals and considers it one of the moderator’s tasks. The analysis showed that participants recommend various requirements of design goals set by moderators.

Goal setting is one of the most significant factors of the online peer group, which helps the group members to change their behaviour by following distal and proximal goals. However, setting complex or challenging goals could lead to making the goals conflict - users could not achieve the goals. Those interviewed indicated the various requirements of moderator features when setting group goals. The first requirement recommended by some of the participants recommended the online peer group should be designed to allow the moderator's ability to resolve group conflicts by "*checking the individual or collective user goals*", as well as "*discussing the goals with members - if there are any conflicting goals, moderators should resolve it*" by making the goals more reasonable and achievable. As when conflicting goals are not adequately considered, it may lead to a failure or unsuccessful intervention systems (Vohs and Baumeister, 2016).

The second requirement suggested by some the participants suggested that the online peer group platform should be designed to "*allow moderators to set collective or individual goals specifically for new members*". The participants argued that some of the new members had difficulty setting goals because they do not have enough knowledge to set reasonable and achievable goals. Some of the participants mentioned that some of the group members had difficulty controlling their behaviour. They required "*more help and support from moderators, specifically in setting their own goals, and the collective goals are not useful to users who have problems with controlling their usage behaviour*".

The third requirement is that the moderator should be able to review individual and collective goals and have the ability to modify the goals to become achievable goals that would motivate users to commit to the group goals. The analysis showed that the participants suggested that the moderator should have two features when reviewing the goals.

- The first feature group moderators should provide us clear instruction to the group members, including "how to achieve the goals and how to clarify the strategies that should be followed to reach the group target" of changing their behaviour.
- The second design feature is that the moderator should have the ability to discuss with members the "barriers to goal attainment".

The last feature of the moderator role is the ability to modify group members' goals and usage plans. The interview showed that participants required that the group moderator should be able to modify group members' plans, and they have two various design opinions of modifying the goals. The first opinion mentioned by some of the participants is that they required the moderator to stop the tracking system for specific users for a period. For example, participants mentioned that "*I am a student, and sometimes I use digital media for study purposes, so it is useful if the moderator enables me to stop the*

tracking system, after contacting the moderator and clarifying a reasonable reason". The second opinion was mentioned by five participants who required the platform to be designed to enable the moderator to change the time-plan for a specific user. For example, a participant mentioned that *"sometimes I am doing something important, or I am travelling so I need extra time on specific days' the moderator should be able to change the time plan."*

Monitoring

The interview analysis showed that one of the important tasks for the group moderator is to monitor group members' performance and peer's interaction. This would enable them to evaluate changes in members behaviour (Maitland and Chalmers, 2010). The participants-recommended that various requirements should be considered when designing the group moderator monitoring system. The first design requirement is that the moderator should monitor group members' performances; the participants have three different preferences regarding the monitoring of group members' performance.

- The first preference is that the platform should be designed to allow moderator to monitor group members' *"proximal target and members achievements"*. At the same time, the moderator should be able to *"monitor members' progress towards their proximal target"*. They argued that monitoring users' progress and achievement towards the proximal goals would help moderator deliver suitable feedback and guidance. The users who struggle to achieve the group goals could get more help and support.
- The second preference is to allow the moderator to monitor group members progress *"toward the distal goals."* If any member achieves the distal goals, it means that they successfully changed their behaviour.
- The third preference mentioned by some of the participants is that they require the moderator to be able to *"monitor group member's progress and achievement and compare it with other group members"*. Also, moderators should be able to monitor peer progress and compare it with specific peers. Participants mentioned that the progress could be *"compare current and past progress"* to help users know their target achievement and their level of changed behaviour.

The second design requirement mentioned by some participants is that they think the moderator should have the ability to monitor the group's communication style and interactions, such as being a distraction or helper. Monitoring members interactions is *"monitor messages and feedback send between members"* - the interaction could be positive or annoying messages. The positive interaction could be that the member helps and supports other members, *"if any member helps others, this could result in the moderator giving an award such as points, badges or leader*

board". The opposite is negative interactions. The moderator should be able to detect if a member is annoying other members by sending inappropriate messages, such as a message saying, "You could not control your usage; you are the loser". So, the moderator should detect that monitoring the member interaction and based on that, could provide penalties. Finally, if the moderator detects any member distracting other members by "*discussing a topic that is not related to the group goals*", the moderator should provide reasonable penalties.

5.2.1.2 MODERATOR NATURE

The analysis indicated various requirements of the group moderator's traits, especially of the sentient nature of moderator characteristic in the peer group. Participants have three viewpoints regarding the moderator's nature. The first viewpoint is that some participants required that the moderator be human and that "*would help to understand member feeling and provide a support based on the human experience*". The second viewpoint is that they recommended that the platform should be managed by intelligent software. They argued that intelligent software would provide "*24-hour help, and advice and members will get a response immediately from the moderator*". The last viewpoint recommended that the platform have blended management that has both human and software management. The participants argued that the platform should be "*managed by intelligent software*" and respond to "*sending notifications and feedback messages*". At the same time, the platform should have "*human admin which responds to support members and provide human support*".

5.2.1.3 MODERATOR ALLOCATE STRATEGY

There were several strategies recommended by participants on the way to allocate group moderator. The interview found various opinions on how to allocate group moderators based on vote strategies, experience, and rotation between members or based on member progress achievement. The first opinion required the group to allocate base on voting technique, and "*group members should vote for the group moderator, the moderator could be a group member, or persons offer themselves to be a moderator*". The second opinion was that some participants required the moderator to have experience, and the participants had different preferences about experiences.

- The first experience preference is that some participants required the moderator to have recovered, having had this problem before. The participants argued that "*recovered people could provide the best advice because they had had this problem before*".
- The second preference requires that the moderator should have experience in group management. Some of the participants argued that management experience "*would help manage the group members and make the group successful*".

- The third preference is that some participants required the moderator to be a counsellor in behaviour change. A participant said that *“if the group moderator were a counsellor, that would motivate me to join the group and accept the moderator’s advice”*.

The third opinion on allocating group moderator is that some of the participants required a rota to decide the moderator role. The participants mentioned that the moderator role should be rotated between group members and that each member should have the opportunity to be group members, which *“would help members learn how to be a moderator”*. The last opinion is that group moderators should be one of the group members and allocated based on the performance and goals achieved. Some of the participants mentioned that the member who is achieved the group goals should become a group moderator. A participant commented that *“the member who has achieved most of the group goals or collected more points could become the moderator of the group”*.

5.2.1.4 REINFORCEMENT FUNCTION

Participants felt that the online peer group should have some of the digital motivation and positive reinforcement functions; the group moderator should have the authority to provide the reinforcement functions. Participants felt that the reinforcement functions are important factor of the online peer group and have benefits which encourage and motivate group members to achieve the group goals. They could also motivate users to change their behaviour. Participants recommended that the reinforcement functions should be fun and have some sort of gamification, defined as the integration of game elements in a context other than games elements (Deterding et al., 2011), which would *“help to encourage group members to modify and change their behaviour toward digital media”*. The interview analysis indicated two different viewpoints regarding the criteria of providing the reinforcement functions.

The first viewpoints regarding the criteria of the moderator providing the reinforcement functions to the group members are based on member performances toward their goals and targets. Participants recommended that the reinforcement functions involve rewards and penalties which aim to motivate and encourage group members to achieve the group goals.

Also, some of the participants felt that the group moderator should be able to monitor the group members’ progress and performance toward their goals and any member that achieves a program should be provided with rewards. At the same time, the member who does not achieve any progress should be given a penalty by the moderator. Participants suggested different opinions of what the rewards should be and the strategy of providing the rewards. They suggested that the moderator should monitor the group members’ progress towards their goals. Members achieve progress as *“points provide a reward”*. Also, participants recommended that the member who *“collects certain points should receive badges”*. They also suggested that members who achieved

a certain target should be able to “*upgrade or change member level if they have more than one level, or the member could become group moderator for a certain time*”.

The participants who agreed the online peer group should have rewards based on member performance suggested that the moderator should also provide as negative reinforcement such as penalties. Some of the participants suggested that the penalties “*should not be harsh*” and penalise the member who “*could not achieve any progress or who has a slow performance*”. Some of the participants mentioned penalty should not cause harm to the members feeling or self-esteem, the aims of penalties is to motivate the member to control their behaviour. Participants recommended several types of penalty such as “*reduce points, reduce level, remove badge or ban member*”. Also, members suggested that members who do not participate with the group should be banned and “*the ban could be temporary or completely*”. The participants suggested that banning a member completely should only occur after sending several notices and a warning message from the group moderator. Then, if the member seems not to be participating with the group goals and activity, the moderator can ban them completely. Participants commented that “*a member who joins the group but does not contribute should be penalised by a reduction in points or exclusion from the group.*”

Some of the participants suggested reinforcement should be designed and governed as a “*fun*” activity and should be based on “*competition between group members*”. Participants suggested the system should be designed to compare peer performance with other group member’s performances and based on the results, the group moderators can provide rewards like achievement of individual users on leader boards (Richter et al., 2015). Some of the participants suggested that the “*leader board is more effective than points and badges*”; other participants suggested that members who achieve good progress should the moderator “*write members name in at main page of the platform*”.

The second viewpoint regarding the criteria of the moderator is to provide the reinforcement function based on member attitudes and interaction within the group. Some of the participants felt that the moderator should monitor member’s interactions and the rewards should relate to the role members can take in the group, and how helpful and instrumental they are. A user who becomes a helper, for example, a member who helps other group members with advice and moral support should “*get points and a member who has high points could become group admin as a reward*”. Otherwise, the penalty should be related to when “*violating the group norms and disturbing others*”, the penalty suggested as reduced points or banning members, temporarily or completely,

5.2.1.5 MODERATOR SKILLS

The interview explored moderator knowledge, and experience was highlighted as one of the important factors that could motivate users to join the online peer group. Participants have various perspectives of moderator knowledge and characteristics that would lead to various preferences

of the knowledge should have. First preferences of some of the participants are a focus on the domain experience of moderators and providing various opinions.

- The first opinion is that some of the participants would prefer the moderator to be a recovery person and has overcome the problem before. The participants argued that a recovery person *“has more knowledge than a therapist and could provide reasonable advice”*.
- The second opinion is that it's preferred that the moderator should allocate moderators who have knowledge in behaviour change. They argued that the moderator could provide help and support to the group members who required the moderator to be an expert who *“provides useful guidance and advice to the member”* in how to change their behaviour.
- The third opinion recommended that the moderator should be a counsellor. Some of the participants mentioned that the main reason that motivated them join the group is having a counsellor moderator. *A participant commented that a “counsellor moderator would help group members to change their behaviour”* by providing effective advice and guidelines.

The second preference of moderator skills is leadership management skills. Participants argued that the moderator who has leadership skills would have the capability to motivate and direct the group members to change and control negative behaviour. Participants felt that the moderator who has leadership skills would be able *“to explain in clear steps how to achieve the goals”* and what is expected for them to do so. Also, participants felt that the moderator should be ensuring all members know their goals and targets and *“provide some strategies that help to achieve their goals”*.

Some of the participants mentioned that the moderator who has leadership skills would have the ability to *“listen to the group members' issues and difficulties facing them to change the behaviour”*, which would help the moderator decide the best ways to deliver his/her vision to the group members. Some of the participants prefer the moderator to have management skills. They claim that management skills would help the moderator to motivate group members to work toward achieving the group target. Management skills help the moderator to plan and deliver skills that could be beneficial to the group members who have difficulty following the group goals. So, the moderator would be able to provide a plan to the user who cannot achieve the group target.

The third preference of moderator skills is communication skills, which is considered to be one of the most important traits of moderator characteristic. The participants' recommended five opinions of moderator communication skills such as verbal, non-verbal, written, visualizations and diplomatic skills.

- The first opinion preferred that the peer group should be designed to allow the moderator to deliver audio feedback to the group members. The participants mentioned that peer group could have “voice chatting room features” and they recommend the moderator should have verbal communication skills which mean sharing the message and feedback between moderator and members by using speech. Participants argue the “spoken word is more effective”.
- The second opinion preferred that the moderator should use appropriate non-verbal communication. Some of the participants prefer to receive a facial expression from the group moderator which expresses the goal’s progress.
- The third opinion preferred that the moderator should have written communication skills. The participants focus that the group moderator should have written communication skills, they argued that they should receive “*clear feedback that would be more effective*” and the moderator feedback should be written in a way that can convince and motivate participants.
- The fourth opinion is that the moderator should have visual communication skills. Some of the participants recommended that moderator feedback should be sent as a graph or chart and the moderator should send clear and easy charts or diagrams.
- The last opinion was that the participants recommended that the moderator should have diplomatic skills that would help members epically when they set collective goals also would help to manage the members interactions.

5.2.1.6 MODERATOR AUTHORITY

The last requirement of group moderator features is that the moderator should have the power to manage group membership, lock applications and change the platform interface. The participants required that the peer group should allow the moderator to lock social media applications. For example, a participant mentioned that “*moderator should be able to lock digital media apps when any user exceeds the time limit*”. Also, some of the participants prefer that the moderator should have the power to manage membership, such as add a member, for example “*if a member leaves the group the group moderator should have the ability to replace them with a new member*” Also, they would prefer that the moderator should have the ability to ban members based on progress or interaction. Participants commented that “*any member that doesn’t interact with other group members could be banned for a period of time by the moderator*” or “*any member that distracts other members could be banned forever*”. Finally, three participants preferred that the moderator has the ability to change the platform colour and notification sounds. A participant commented that the moderator should have the ability to change the platform colour which is represented by different colours to indicate user progress. For example, “*green means doing well, yellow means you are close to exceeding the goal limit and red means you have exceeded the goals*”.

5.2.2 GOVERNANCE FUNCTIONAL

The interview analysis indicated that the participants determine the functional requirements of the online peer group and suggested various opinions on how to govern the functional requirements. The functional requirements of the online peer group would mean that users must accept joining the online peer group and commit to the group goals. The participants suggested various opinions around how to govern some of the online peer group factors. The key factor of the group is comparison and the participants recommended different design governance to compare group members' progress and interaction. The second important factor of the online peer group is feedback and the participants suggested various opinions about how to govern the feedback source, subject and communication channel. Also, reinforcement function and goal setting are considered two of the important factors of the design of online peer group, see Figure 23.

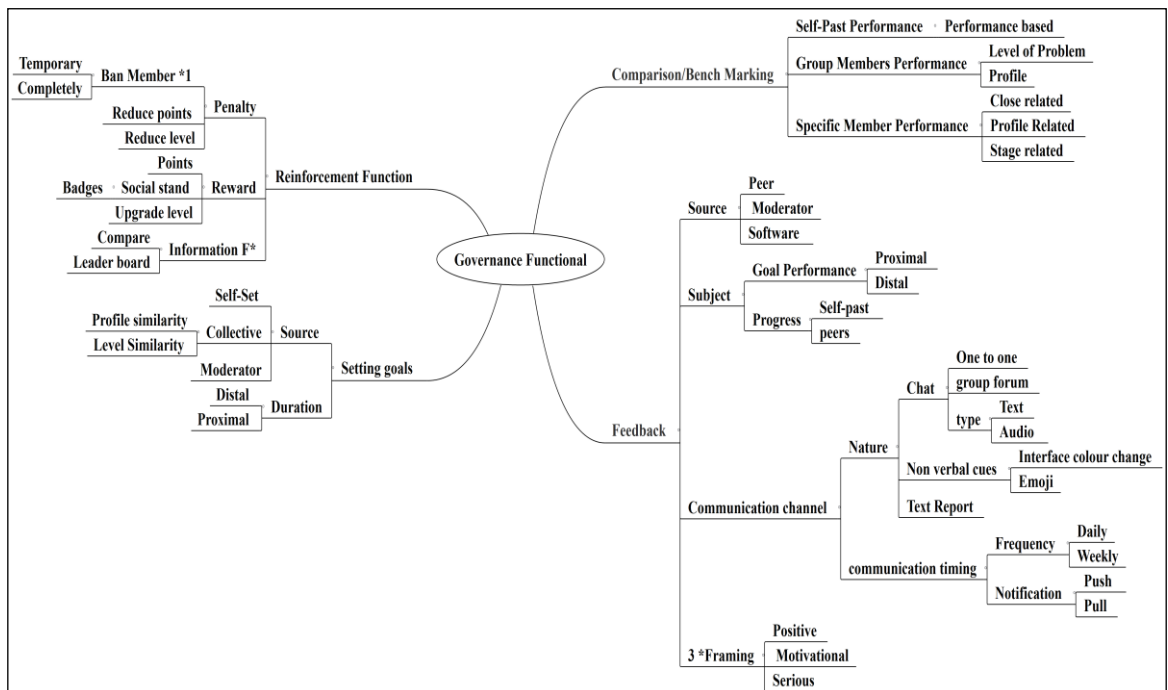


FIGURE 23: FUNCTIONAL GOVERNANCE FEATURES

5.2.2.1 FEEDBACK

Participants felt that feedback is an important factor in the online peer group's design and could affect the feelings of members, commitment to the goals, and their behaviour. Participants argued that feedback should be meaningful and should motivate users to change their behaviour. The participants had different variability opinions regarding the feedback source's design, feedback subject, communication channel and framing.

Feedback Source

Participants' felt that online peer groups should have feedback. They suggested that the feedback could come from different sources that aim to change behaviour, offer peer support and share

knowledge. The participants have three opinions regarding the feedback. They suggested that the feedback could come from three sources: peers, moderators, and software or blended.

The first opinion is that some of the participants preferred the feedback to come from the moderator. The participants suggested that the moderator should have the ability to access group members' digital usage before making a judgement and sending feedback based on the judgment. The participants suggested that the moderator's feedback should be "*encouragement or advice on how to deal with addiction or guidance regarding the member's performance*". Moderator feedback is discussed in more details in the moderator tasks section (5.2.1); that section explains more about the participants preference and opinions regarding the moderator feedback.

The second opinion is that the feedback could come from other group peers; some of the participants recommended that the online peer group should be designed to allow peers to deliver feedback to each other. The participants suggested that the peer feedback should be "*to motivate and encourage other peers*" and feedback could also be "*emotional support*" to support peers emotionally, which would help to control the target behaviour. The participants recommended that peer feedback should be monitored and controlled by the group moderator. Other participants had different opinions. They recommended that peer feedback should be about sharing "*knowledge, story or strategies that help and guide peers to achieve the group goals*".

The last opinion suggested that the feedback should be delivered via software; some of the participants preferred the software to monitor their performance and goals achievement and, based on the user's progress, the software delivers the feedback. A participant commented that "*I prefer to receive feedback from the software based on my progress toward the group goals or based on comparing my current progress with past progress*". The participants recommended receiving the feedback in a "*chart or diagram*" and "*should be easy to understand*" which shows their progress ". This shows that the feedback's visual appearance is essential to the participants, and this is in line with the findings by the authors in (Alrobai et al., 2016a).

Feedback Subject

The participants felt that the feedback should have specific reasons and subjects; the interview indicated variability in the feedback subject. The first preference is that some participants felt the feedback should be about the user's goal performance, which would help the user know the goal's progress and level achievements. The participant suggested two viewpoints about the feedback of goals progress.

- The first viewpoint recommended that the software or moderator should deliver feedback about "*user proximal (short term) goal's achievement*", which would motivate users to achieve the group goals.

- The second viewpoint recommended that the feedback should be about “*the distal goals (long term) achievement*”, which would help members understand their performance and progress over a short period.

The second preference is that some of the participants suggested that the feedback subject should be comparing the users’ progress and achievement. The participants suggested three different opinions about comparing user progress.

- The first opinion preferred the feedback to compare the user’s current status with the status when they joined the group. This would help the user to know the level of achievement and progress.
- Another opinion is that some of the participants preferred feedback to compare the user’s goal progress, with specific peers or all group members goals progress, which would encourage them to achieve their goals.
- The last opinion is that some participants preferred the feedback to be about how others’ status is compared with their status when they joined the group.

Feedback communication channel

Participants felt one of the important factors that should be considered when designing the online peer group is to determine the feedback communication channel and how users would like to receive the feedback from a moderator, peer or system. The interview analysis indicated variability preferences regarding the nature of the online peer group's communication channel and the time deliver the feedback. Participants had three different opinions regarding the nature of the communication channel. The first opinion was that some participants recommended that the feedback be delivered in the chatroom. The participants suggested two viewpoints of the design of the chat room.

- The first viewpoint is that some of the participants recommended that the online peer group be designed to receive the moderator feedback in a one-to-one chatroom. They argued that the one-to-one chat would help discuss user progress and understand the moderator's feedback in more detail. For example, a participant mentioned that “*one-to-one feedback is more effective and allowed moderators to discuss their progress in a private environment without concern that any members could know their progress*”.
- The second viewpoint is that some participants felt that moderator feedback should be in a group chat forum. The participants suggested that the group members should have the ability to read or listen to other group member's feedback and the discussion between moderator and member. The participants argue that the feedback in group chat would help other members to learn from the others feedback and the advice provided to members from the moderator. A participant commented that “*moderators delivering user feedback*”.

front of other group members are useful and more effective, enabling peers to learn from others' feedback".

The interviews also showed that the participants recommended two different preferences about the communication types in the chat room.

- The first preference suggested that the feedback should be sent as audio - the participants suggested that audio is *"more effective and improves the quality of the feedback"*. The audio feedback could also affect the user emotionally, feeling positive, which could encourage the user to follow the feedback messages. For example, a participant commented that *"I do not prefer to read a long text also the feedback voice tone is more effective and explain the feeling of the user and moderator"*.
- The second preference recommended that the feedback should be text. The participants recommended that the *"feedback text should be clear and use understandable language"*. The participants argued that written feedback has *"more details about user performance and progress toward goals"*, which would help the user to understand the feedback context because it was easy to follow. Also, both moderator and peer could use language that could motivate and encourage the user to achieve the group goals. A participant commented that *"written feedback is a more reliable method of communication"*.

The interviews showed that some of the participants felt that the feedback should be easy, and consequently, the user knows the progress quickly. The second opinion is that the participants suggested the online peer group feedback communication should include non-verbal cues. Some participants recommended that the feedback could change the platform colour scheme. The moderator or system should have the ability to change the platform colour to red if the user's progress is not good or green if the user is doing well and making progress. For example, a participant commented that the platform colour should be *"green means doing well, yellow means you are close to exceeding the goal limit, and red means you have exceeded the goals"*. Other participants preferred that the feedback should include an emoji, and they argue that emojis are easy to present and provide quick feedback. Also, the emoji expression would help the *"user to understand the feedback quickly"*.

The third opinion showed that the participants recommended two various preferences regarding feedback time and frequency. The first preference seemed to be that some participants preferred that the online peer group be designed to allow users to customise the feedback time and frequency. Some of the participants preferred the feedback to be received hourly, several times a day, once a week or *"users to have the ability to query the software about performance whenever they like"*. The second preference recommended that the online peer group design should allow users to receive feedback in real-time. However, some of the participants recommended the system deliver the feedback message, perhaps following a pull approach in which the *"software automatically generated and sent the feedback"*. For example, when the user exceeds the goals

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limit the system automatically generates the feedback and communicates to the user. The other approach recommended by some of the participants is the push approach, which required the feedback to be triggered, allowing the user to check their status which would allow users *to know their progress and the target achieved*".

Feedback Framing

Feedback tone is an important aspect and could affect users' health emotional and self-esteem and affect whether the user accepts or rejects joining the online peer group. The participants recommended that the feedback must be framed in such a way to influence group member to adhere to the group goals. The interview analysis showed that the participants have three different preferences to feedback tone. The first preference recommended by some of the participants is that the feedback "should be framed to be positive" which would help the user to increase performance. The second preference preferred the feedback to be framed to include "positive and negative" messages. The participants argued that positive feedback increases the user's performance, but the participants mentioned that users need negative feedback to clarify their weakness and motivate them to increase their performance.

The third preference recommended by some participants is that the feedback should have an encouraging tone because the user needs to receive reinforcement and motivational feedback to help them reach the group goals and *"not affect the user's self-esteem"*. The last preference had two different opinions. Some of the participants prefer the feedback to be *"serious and have some order and instruction"*. The other opinion is the opposite, in which some of the participants preferred the feedback to be *"factual and neutral, i.e. facts and numbers, with no tone in it"*.

5.2.2.2 REINFORCEMENT FUNCTION

One of the essential factors that should be considered in the online peer group's governance and design is the reinforcement function. The interview showed that the participants have variability design requirements of the reinforcement functions' design, which motivate users to control their behaviour and encourage them to achieve the group goals. The participants recommended that the system or moderator have the authority to provide the reinforcement function. They suggested various criteria and strategies provide the reinforcement functions to the group members.

The participants felt that the reinforcement functions should be *"fun and have some of the gamification elements"*. The participants had different opinions about providing the reinforcement functions and suggested variability of gamification elements to include it in the online peer group design. The first opinion was about providing social recognition, such as a reward of reinforcement functions. The participants had different preferences regarding the type of rewards that motivate users to change their behaviour and achieve group goals. Some participants suggested that the reward should be provided based on the user who has had a good performance.

Some of the participants recommended that the rewards should be “*points to the user who achieved a good performance or who interacted with group peers*”, any member who collected a certain number of points meant the system or moderator could upgrade the user’s level. Other participants suggested that any user who “*collected a certain number of points, the system should convert the points to badges*” to motivate the user to achieve the group goals.

The interview analysis showed that some of the participants suggested the positive reinforcement functions could involve a penalty which could encourage users to achieve the group goals and follow the group roles. The participant suggested different types of penalty and two preferences regarding the strategy of provide penalty.

- The first preference is a penalty based on the members of interactions within the online group. The participants suggested that the penalty should perhaps be “*banning their member temporarily or completely*”. The participant suggested that the penalty be provided to a member who “*disturbed other members*”, and users who violated the group norms or distracting others.
- The second preference recommended that the penalty be based on member performance; the participants recommended that the member who has “*poor performance should be penalised by reducing points or adjusting the level of members*”.

The second opinion is that some participants recommended that the reinforcement function provided was based on progress comparison or group performance. Some participants suggested that the software compare users’ performance toward their goals, and any users who achieved a good performance should have a social recognition provided to them. The other participants had different suggestions - they recommended that the system should be designed to compare group member performance and “*users who have top performance could have their name appear on the leader-board*”.

5.2.2.3 COMPARISON

Comparison is one of the essential aspects of the online peer group; the interview indicated that the participants should focus on the comparisons and provide various preferences on how to govern the comparison features. The participants had variability preferences of the comparison strategies in the group. The first preference is that the comparison could be based on self-past performance, the group member’s performance and a specific member’s performance.

The participants felt that comparison is an important aspect and encourages the user to achieve group goals. The first opinion recommended by some of the participants is that of self-past comparison. The participants recommended that the online peer group “*compare user status with their status when they joined the group*”, which would motivate the user to adhere to the group goals and help users know the target achievement and the level of control with the target

behaviour. For example, a participant mentioned that *“I would like the moderator feedback to be about the current performance and past-performance, which would help me understand my progress and encourage me to achieve the usage goals.”*

Participants felt that *“the more effective way to motivate a user to achieve the group goals is to compare their user performance with another group member”*. The second preference is comparing a group member’s performance - the participants had two different opinions regarding the compared performance with other group members. The first opinion was that some of the participants recommended that the system should *“compare their goal performance with peers who have the same level of the problem”*. That would be useful and help a user know their level of progress toward the goals. The second opinion preferred that the comparison is with a member who has the same profile, such as (gender, age, job, education, etc.) which would motivate the user to control their behaviour and achieve the group goals.

Some participants felt that the user’s performance comparison should be with specific peers and have three different opinions. The first opinion preferred to compare a user’s performance with peers whom they have a relationship with such as friend or relative who would build trust with the platform and encourage members to adhere to the group goals. For example, a participant commented that *“I prefer that the group members are friends and the platform compares member usage with others which would help reduce usage”*. The second viewpoint preferred comparing with peers who have similar profiles because they thought that comparing this would be effective in achieving goals. For example, a participant commented that *“I prefer the group members to be PhD students, compare usage with the members and see their comparison report. The members usage should be less than mine, which will encourage me to work hard to be like them because I will realise that I am wasting most of my time on social media than others”*.

5.2.2.4 SETTING GOAL

One of the essential factors that should be considered in governing the online peer group is goal setting, which helps group members to change their behaviour and achieve their targets. Participants felt that setting achievable goals would help them change their behaviour but setting a complex or tough goal could lead to the goal becoming conflicting, affecting users self-esteem and resulting in them leaving the group. The participants recommended that the group should have *“proximal (short term goals) and distal (long term goals)”*. The distal goals would help members to know what they could achieve after some time. The short-term would help members *“focus on activating the goals and determine targets that would also help them compare their current and past progress”*.

The interviews indicated that the participants recommended different preferences about who is responsible for setting the group member goals. The first preference preferred that the goals are

set individually with some of the participants preferring to set their own goals. The participants had two opinions regarding setting individual goals.

- The first opinion is that some of the participants could not control their behaviour, and individual goals are useful for their issues and would help them control their behaviour. A participant mentioned that *“collective goals are useful to the person, who can control the digital media usage, but some people have difficulty controlling their behaviour and are not able to commit to collective goals, so individual goals are more effective”*.
- The other opinion is that some users would join the group to achieve specific targets and set their own goals. At the same time, they do not prefer competition, but to share goals with others so that individual goals are useful to them and should govern the group to allow members to set their own goals. A participant mentioned that *“I can set a goal for myself, but I need help from the group member to limit my time especially I use social media a lot, so I need help set up my goals and reduce it to three or two hours a day”*.

Participants felt the online peer group aimed to share knowledge and experience. The participants recommended the goals be set collectively between the group members, which would help members share knowledge. The second preference is setting group goals collectively between group members. The participants had two opinions about setting the goals collectively.

- The first opinion is that the collective goals should be set to the members who have similar usage levels that would help set achievable goals. A participant commented that *“before setting collective goals, the platform must define each user to normal, average and above-average usage to define too much use, e.g. 3 hours or 5 hours. The collective goals set up should depend on the member’s level.”*
- The second opinion is that the goals should be set for members who share similar usage levels and experience such as postgraduate students, members who work in the same place or are of similar age, etc. This would help to motivate them to achieve the goals. However, the participants recommended that the group moderator should *“have the ability to check if the goals are achievable, complex or easy”*.
- The third opinion is that the moderator should set up the group members’ goals because they have the experience and knowledge to set reasonable goals. This part is discussed in more detail in moderator tasks, see section (5.2.1.1).

5.2.2.5 GOVERNANCE NON-FUNCTIONAL

The interview indicated that the participants have variability factors in the design and governance of the non-functional requirement of the online peer group. The non-functional aspects of the online peer group are privacy, exit procedure and membership criteria and tracking system see Figure 24. The interview analysis showed that the participants have different viewpoints and

opinions of the non-functional requirements, and they provide various suggestions on the design and governance of the non-functional requirements to the online peer group.

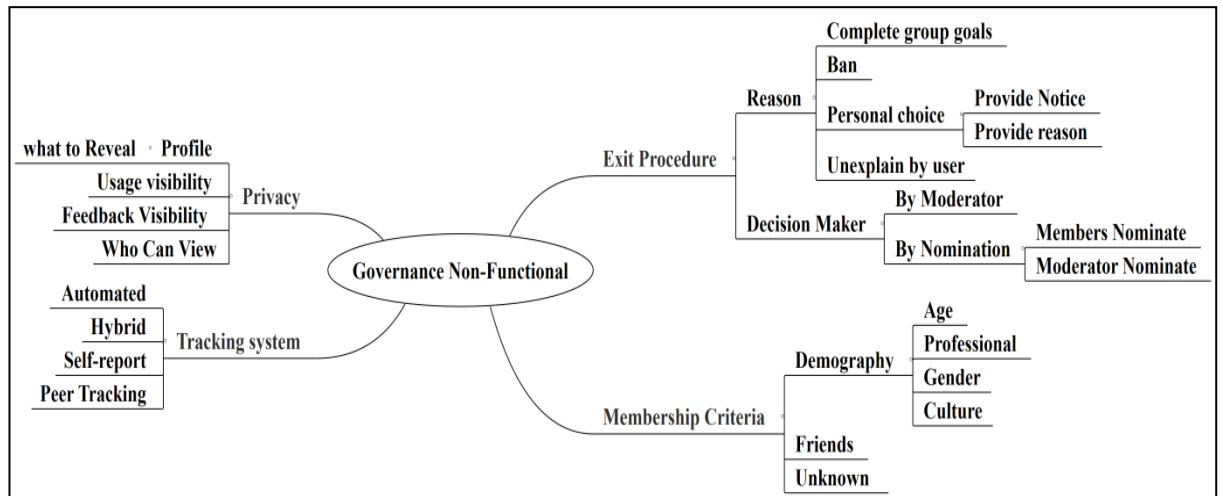


FIGURE 24: NON-FUNCTIONAL GOVERNANCE FEATURES

The participants felt that the online peer group should have some strategies and procedures to exit from the group; they provide two viewpoints to the group's exit procedure. The first viewpoint is that the "user should have reason to exit from the group", and the participants suggested four various reasons which allow the user to exit member from the group.

- The first reason to exit from the group is "the user completes the group goals and is successful in controlling the target behaviour", and they provided three preferences as to who decides if they exit the group. The first preference is that the group moderator should be responsible for exiting the member who has achieved the group goals.
- The second preference is that the members themselves should decide to exit from the group. A participant mentioned that "the group should not have any condition to exist, and the user should have the freedom to leave the group anytime".
- The last preference is that the software decides based on the user's performance toward distal and proximal goals. Participants mentioned that "the system should have the ability to track members goals achieve, and any member does not achieve any goals should the system ban the member".

The second reason to exit from the group is that any member who violates the group norms and mission should be banned and forced to exit the group. Some of the participants provided different opinions on who decides to ban members from the group.

- The first opinion is that the moderator should detect any member who violates the group rules or distracts other members and then decides if they should leave the group. A participant commented that "the moderator should track user interaction and ban members who send inappropriate messages or friend requests to others".

- The second opinion suggested that the software decide which member should leave the group based on data performance and group interaction. For example, a participant mentioned that *"the system should send a warning message to the user who has low performance, and if the member does not change their performance the system should ban them from the group"*.
- The third opinion suggested that the online peer group had a group vote based on a recommendation by some group moderator members. The members vote to decide if the member should leave the group.

Some of the participants agreed that the member could exit from the group without any restriction. However, they preferred that before the member leaves the group, they should explain. Participants had two opinions about the strategies used to leave the group. The first opinion is that when a member decides to leave the group, they should *"provide notice to the members and tell them when they will leave the group"*. This would give the group moderator time to replace the leaving member with a new member. The second opinion mentioned by some of the participants is that before leaving the group, the members should *"provide a reason when wanting to leave the group"*. They argued that it would help not to affect the other members' feelings. However, some of the participants mentioned that the member could leave the group without providing a reason or explanation.

5.2.2.6 MEMBERSHIP CRITERIA

Membership criteria is one of the most important factors that should be considered regarding governing the online peer group. It could affect the user's desire to join the online peer group. The participants seemed concerned about group membership, and they have various requirements that should be considered about the governance of the non-functional to the online peer group. The interview showed that the participants have two different viewpoints regarding the membership criteria, affecting whether a user is accepted to join the online peer group. The first viewpoint is about group member demography; the participants preferred that the group members have similar demographics such as age, gender, culture, and profession. They argued that the group members should have similar demography because that would motivate members to commit to the group goals and encourage everyone to achieve the group target. A participant mentioned, *"I prefer to join a group with members who are PhD students, which would encourage me to reduce my usage if they use less than me"*.

The second viewpoint is that some of the participants preferred that the group members be friends or family because that would make them *"feel comfortable to share their usage and issues with people who knew them"*. Some participants argued that a group of friends would encourage users to accept peer feedback and exchange advice. One participant suggested that the group comprises

either friends or relatives, because "*what members could share with friends, they could not share with their relatives*".

On the other hand, the last viewpoint is that some participants preferred the group members to be people who do not know them. However, they recommended that the members have a "*similar personality and profile such as hobbies, values and communication styles*". They argued that family and friends would judge them regarding their digital usage which could also have a negative impact on their goal achievement and performance; for example, if any member did not achieve the group goals, another group member, if they were a friend or relative, would comment: "*Do not worry, it is just a day*".

5.2.2.7 PRIVACY

Privacy is an essential factor of governance and design of the online peer group. The interview showed that privacy and data protection are among the most significant things that influence users to be accepted to the group. The participants felt that the online peer group "*should be governed and design to authorise users to restrict the data visibility from other members in the group*". This shows that users are concerned with protecting their personal information, as discussed in (Cutillo et al., 2009). The analysis showed that the participants should provide three different design requirements to restrict data visibility from other group members. The first requirement is the profile's privacy. The participants had two different opinions about the profile information restrictions. Some participants suggested that the profile information should be "*visible to the moderator and hidden from other members-only the username and pictures are visible*". A participant commented: "*I prefer that my profile information is hidden, and the profile only displays the username and avatar picture*". The other participants suggested the profile information should be available to all the group members. The user should have the authority to customise the hidden and visible information. A participant suggested that "*I prefer the group design to allow users to choose which information is visible and hidden. It should also allow the user to have the ability to hide some information from specific users.*"

The second design requirement to govern the privacy of the online peer group is performance visibility. Some of the participants preferred their performance data such as progress and rewards should be invisible from other members and should be visible only to the group moderator. They argued that the visibilities of members performance could affect their decision to join the online peer group. The participants argued that "*if the group members is a friend and can access their usage, maybe in real life they would judge them about their usage*".

The third governance requirement is feedback visibility. Some participants do not want anyone to see the feedback sent by the moderator or software regarding their progress. Also, some of the participants recommended that peer feedback is invisible to the moderator. They suggested the group ask for the feedback to be hidden and invisible to other members. Participants mentioned

that “group moderator feedback should be hidden because I do not want any members to judge me about usage and progress” (Kobsa and Schreck, 2003).

5.2.2.8 TRACKING SYSTEM

The tracking system is one of the essential factors of non-functional requirements; the participants mentioned four different viewpoints regarding the tracking system requirements. The first viewpoint suggested that the tracking system should be automated. Some participants argued that automated tracking is accurate in their problematic issues. A participant commented that “*the platform should automate and monitor the digital media usage that would provide accurate results*”.

The second viewpoint is that the tracking system should be governed to allow the user to self-report digital media usage or the behaviour intended to control it. A participant mentioned that “*sometimes I use social media from a different device*”, so the self-report would help the user know the accurate usage or behaviour.

The third viewpoint recommended that there should be a hybrid between automated and self-report. Some of the participants mentioned that “*sometimes the social media use from different devices so the platform should have features to allow the users to report usage and in the same time the system should track the user usage*”. The last viewpoint is that peers should have the ability to report other peers’ behaviour. For example, “*if a member saw another peer smoking, the system would allow the peer to report that to the tracking system*”.

5.3 DISCUSSION

The interviews explored various preferences and variabilities requirements of design moderator, governance functional, and non-functional online peer group requirements. In specific findings, the analysis indicated interrelations between different performance variability of an online peer support group's design. These interrelations are summarised in Table 12. The following section explains the interrelation between the design preferences:

- *Moderator authority (add or ban member)*: Moderator has authority to manage group membership by adding a new member or banning a member either temporary or permanently from the online peer group. To assist the moderator to ban member, two functions are needed to support the process. First, the exit procedure function could help the moderator decide on banning a member who does not achieve any progress or a member who violates the group rules or distracts other members. Second, the reinforcement function could help moderator authority provide the penalty, i.e. ban a member based on member performance or interactions. The moderator has the authority to add a new member. The membership criteria function would support the moderator to

decide the criteria to follow to execute such a task based on demography, or member is known by group members, or member is a stranger.

- *Moderator authorities to lock application:* Monitoring system and membership criteria theme could support the moderator to lock application. In order to support the process of locking or blocking the application, the moderator needs the monitoring system to track members proximal goals achievement. The moderator provides penalty by locking the online peer group application to any member who exceeds the goal target achievement. The reinforcement function would support moderator authority to lock the application.
- *Allocated Moderator strategy (experience-based, vote based):* Three preferences are identified to help allocate the moderator, i.e. based on experience, member vote for the group moderator or rotation between group members. In order to allocate moderator based on experiences and member vote, there is a function required to allocate the moderator, which is the moderator skills. The moderator could be allocated based on domain experience, management leader and communication skills.
- *Allocated Moderator strategy (rotation based):* When the moderator is allocated based on rotation between group members, some functions cannot be used by the group moderator and should, therefore, be hidden. For example, the moderator can provide penalty based on member interaction or goal performance. However, when the moderator is rotated between group members, the moderator cannot ban members or provide a penalty. The rota-based moderator should also not have access to the group members' usage and cannot monitor group members' performance or compare specific user progress with other members. Furthermore, when the moderator is rota-based, the moderator should not have the ability to provide feedback-based member progress and performance because this is against privacy. Also, rota moderator should not have the ability to delete messages that are not in line with the group aims or detect disruptive members, at the same time the moderator should not have the ability to send a warning message to the user who has low progress that would be against the group privacy.
- *Reinforcement function:* The moderator provides reward and penalty based on member interaction or performance. The monitor system is a crucial function to help the moderator monitor members' performance, goal achievement, and member's interaction. Based on the monitor system outcome, the moderator would provide a reward or penalty and at the same time, decide which member or members should be ban from the group. Also, comparison function is essential to assist the moderator in comparing members with their self-past progress, comparing members with group performance or specific members, and based on the comparison result to provide the reinforcement function.
- *Monitoring system:* The monitor system function in the online peer group monitors group members' goals achievement, goal progress and member's interaction within the group. The monitoring and tracking of users' performance could be performed by the system or

members themselves or report from peers. The monitor system is an essential function that helps the moderator provide feedback regarding the member's progress, goal achievement, and member's interaction. Furthermore, the monitor system helps the moderator review the individual or collective member goals, and if there are any goals conflicts, then the moderator should modify the goals. Also, monitoring user's interaction helps the moderator decide to lock application or ban member who violates the group rules or distracts other members.

- *Comparison function:* The comparison function is comparing member performance with past performance, compare group member performance and compare specific member with other members; this function would help the moderator to provide reinforcement function based on the comparison outcome. Furthermore, the comparison functions would assist the moderator and group members' to send feedback to other members regarding the performance and goals achievement. However, this function required some privacy, and the users should decide what data should be revealed from profile and who can see their performance.

The findings showed there is some similarity in the moderator, governance functional and non-functional requirements. However, in certain findings, the analysis indicated there are different opinions, and some participants' preferences are contradicting, it seems there are *ten* paradoxical and conflict in the variability requirements of the online peer group which would need to handle it in further study:

- *Feedback sources paradox:* Participants have paradoxical viewpoints of the feedback sources. They prefer the feedback source from moderator software or peers. Some participants prefer to receive feedback from peers; they mentioned that it would help to share knowledge and experiences. However, at the same time, some of the participants mentioned they do not prefer to receive feedback from peers. They mentioned that peer feedback could be judgemental, which could affect their self-esteem. Also, some participants recommend that the feedback source be from the group moderator and be part of moderator tasks. It seems the participants have various contradicting opinions in the moderator feedback. Some participants prefer to receive feedback from the moderator based on peer's comparison, which is compared to peer progress with other group members' progress. However, at the same time, the participants required the group should have a high level of privacy, and they do not accept other peers to access and share their progress and goals achievement.
- *Feedback communication paradox:* Some participants recommend receiving feedback as text and written, which helps the moderator or peers choose the language. However, in some interviews, the same participants preferred to receive audio feedback; they argued that the audio feedback would help express the emotion and feeling, and written feedback

would not express the emotion. Other participants prefer to receive the feedback as non-verbal such as emoji or change the platform colour based on the progress and goals achievement. Still, some participants mentioned the emoji and colour would not say much about their progress, and they would like to know their progress in details. The participants also have paradox preferences in the feedback timing and frequency of delivering the feedback; the first preference is the feedback delivered in real-time. Still, others preferred the user to determine the time and frequency of the feedback, which could be weekly, daily or monthly and how many times a day. In this case, we need to study further and use negotiation and argumentation to determine the participants' feedback communication and decide which kind of design would be used.

- **Communication channel paradox:** Participants have paradox opinions in feedback communication. Some participants prefer to receive moderator feedback in one to one chatting room and require a high privacy level. Other participants recommend receiving the chat room feedback where moderator, group members and members can read or listen to the feedback. However, some participants preferred to see other feedback, and at the same time, they required that the group should have a high level of privacy and that no one should be able to see their feedback and progress.
- *Feedback from peer's paradox:* Some participants have to contradict the opinions of peers' feedback. Some prefer group peers can send feedback to others regarding their progress and goal achievement, and they required the feedback should be an encouragement or should provide guidance. However, the paradox is that the same participants required the group to have a high level of privacy, and none of the group members should be able to have access to their profile and see their progress and goal achievement.
- *Goals setting paradox:* The participants suggested three conflicting viewpoints regarding who should set the goals. Some participants required the goals to be set individually or collectively, and others preferred the moderator to set goals for users who have problematic control of digital media. However, at the same time, the participants recommended the moderator task is to help members set up their goals and review the individual or collective goals that are set by the members. If there is any goals conflict, the moderator should modify the goals. Also, some of the participants preferred the moderator to discuss the barriers to goals attainment with group members and provide explicit instruction on how to achieve the goals. In this case, further studies are required and include the negotiation and argumentation process to reach an agreement between the participants about the goals setting requirements.
- *Monitoring system requirements paradox:* There is a paradox between participants requirement regarding moderator monitor system. Some participants required the group should have a high level of privacy, and the system should not allow the moderator or

members to access other members' progress and the achievement of the goals. However, at the same, the similar participants required the moderator should have the ability to provide reinforcement function based on member achievements goals and progress. The interview analysis also found that some participants have a contradiction in the communication interaction between members which they required a high level of privacy in the communication and interaction between group members. Also, they required no one to see their feedback and interaction messages. However, the same participants required, the moderator should monitor the group interaction, and if any member is disruptive or annoying others, the moderator bans them from the group.

- *Allocate moderator requirements paradox:* Participants mentioned conflict and contradicting requirements in experience and strategies to allocate moderator. For example, some participants required group moderator allocation to be based on experience in group management. However, some participants have a different opinion, and they required the moderator to be an intelligent system. Still, they accept the moderator to be human if the moderator is a counsellor and has experience in changing people's behaviour. Also, the other conflict opinion in allocating group moderator is that some participants required the group to be a flat group, which means the moderator should be one of the group members. The participants mentioned two strategies to allocate the moderator, i.e. vote technique, where members vote for the person they prefer to be the moderator or rota between group members. For example, any member who achieved specific goals could be allocated as a moderator. So, there is conflict in allocate group moderator. Some of these requirements delete other requirements such as allocate moderator based on vote and rotation delete the other requirements that allocate moderator who is a counsellor or has experience in behaviour change or group management.
- *Penalty requirements paradox:* There is a contradiction in the penalty mechanism and have paradox opinions. Some participants reject the penalty while they require the group moderator to provide a penalty to a member who distracts other members and bans a member who does not participate with group members. The reward system also has a paradox in the requirements; some participants recommend the reward should be provided based on the monitor system or comparing peer progress with other group members. At the same time, the same participant rejects to compare their progress with other members. Also, some participants required the monitor should be self-report at the same time they prefer the reward should be provided in fairways and at the same time they required the online peer group has a high level of privacy and reject the system to monitor their usage so the self-report would not provide accurate data. Some participants prefer the reinforcement functions should be that the group should use leader-board.

However, leader-board need to be accepted by all the group members this kind of feature is not subject of the individual, but the subject of group members preferences.

- *Moderator and peer feedback paradox:* There is a contradiction in the feedback communication between the moderator and peers. Some participants prefer the online peer group to have a high level of privacy in the communication between members or moderator. They required the communication to be one to one chatting room. They required one to one feedback messages to be designed with a high level of privacy and not allow other members to join the chatting room or read the feedback. Simultaneously, some participants preferred to read or listen to other group members' feedback because this would be useful for obtaining informed knowledge. The other opinion in the communication feedback required acceptance and commitment from the group members. For example, to design the chatting room to allow the group members to join and listen or read their group moderator's feedback. This type of feature is required to be accepted and committed by all group members to share their feedback.
- *Exit procedure paradox:* There are paradox opinions and requirements between participants. Some participants preferred the group should be designed as liberal styles, and they preferred the members to have freedom of exit from the group any time, and they reject to be forced to leave the group. However, the same participants required the group moderator should have the ability to ban members who are distracting other group members permanently, and some of the participants suggested that the members should have the ability to vote to ban members from the group. Also, some participants required exit procedure which required commitment from the group members, for example, some participants required that before a member leaves the group should be provided notice and explanation that required commitment from the group members.

The online peer group will be designed for people who have problematic behaviour. The participants could provide requirements that are not useful for them, and the software engineer should decide which requirements should be involved in the online peer group design. Table 12 shows the requirements that should be involved in the group design. The interview findings showed that some of the requirements could not be implemented in the design of an online peer group, which is:

- *Only positive feedback tones cannot be implemented:* The participants required that the feedback should be regarding user goal progress, and they required the feedback must be positive, encouraging and motivational messages. For example, some participants required the feedback must be positive and not involve any judgment or negative message even if the user achieves low progress. However, the participants recommended that the moderator send positive feedback to the user who struggles to achieve the goals or has low progress. It is impossible to send a positive and encouraging message to those who

need advice and warning feedback to inform them about their low progress. A further investigation is required to explore the negative and warning feedback message that would be accepted by people who have problematic behaviour. Such a study could be useful if it uses negotiation and argumentation to enable agreement between the participants.

- *Feedback subject required commitment from the group:* Some feedback requirements are not subject to individual preferences but to the group members' preferences. For example, some participants preferred the feedback based on comparing peer progress and goals achievement with others that required commitment from other group members to share their data. Also, the moderator feedback subject requires commitment from the group members and is not subject to individual preference. For example, some of the participants recommended the moderator feedback to only educate group members on how to control their behaviour based on their progress. Moreover, another feature requirement that requires commitment from the group members and does not require individual preference is the moderator's ability to access the members' progress and goals achievement. Some participants required the group to have a high level of privacy, and they do not accept the moderator to see their progress and achievement. In this case, a further study is required, which includes negotiation and argumentation process to reach commitment between the participants and discuss the options and the opportunities of an online peer group design.

TABLE 12: THE INTERRELATIONS BETWEEN FEATURES

Main themes	Relationships	Relation with other themes	Description
Moderator authority (ban member)	Supported by	<ul style="list-style-type: none"> - Exit procedure (based on lack of goal progress, Decision maker) - Reinforcement function (penalty based on interaction, performance) 	<p>In order for the moderator to have the authority to execute certain functionalities such as ban a member from the online peer group, they would require some elements from other themes to support the process. For example, the moderator would need functionality from both exit procedure and reinforcement function themes. This is because the moderator cannot ban a member without knowledge of their performance information, with this knowledge, the moderator can issue penalty to those members whose performance is below the target goal attainment.</p>
Moderator authority (add member)	Supported by	<ul style="list-style-type: none"> - Membership criteria (friends or family, unknown, demography) 	<p>The moderator has the authority to add a new member to the online peer group. In order for the moderator to execute such functionality, they need elements from the membership criteria theme, i.e. demography information, new member unknown to other group members or new member known to group members.</p>
Moderator authority (lock application)	Supported by	<ul style="list-style-type: none"> - Reinforcement function (penalty) - Monitoring system (achieve proximal target) 	<p>The moderator has the authority to lock application to members who exceed the usage limit. In order for the moderator to perform this function, they would need functionality from the monitoring</p>

			system and reinforcement themes. This would enable the moderator to track group members who exceed their proximal goal target and then provide penalty by locking or blocking them from the application they are using.
Moderator allocate Strategy (experience based, vote based)	Requires	Moderator skills (domain experience, management leader, communication)	The moderator can be allocated based on (i) their experience or (ii) vote strategies. In order to execute such functionality, certain elements are required from the moderator skills theme, i.e. domain experience, leadership management or communication skills, because these elements are vital in determining the right person for the role.
Moderator allocate Strategy (rotation)	Hinders	Moderator authority (ban member)	When the group follows the rotation strategy to allocate the group moderator, the moderator authority sub-theme ban member would be hindered. Due to privacy requirements, when the moderator role is rotated between group members, certain functionality cannot be executed due to inaccessibility to performance information and the comparison functionality.
Moderator allocate Strategy (rotation)	Hinders	Reinforcement function (penalty based on performance)	When the group employ the rotation strategy to allocate the group moderator, the reinforcement function sub-theme to provide a penalty and ban member based on goals performance would be hindered. This is due to group members' privacy concerns.

Moderator allocate Strategy (rotation)	Hinders	Monitoring system (monitor performance)	When the group follows the rotation strategy to allocate the group moderator, the monitoring system sub-theme, i.e. monitor performance, would be hindered. This is because the moderator would not have the authority to access goal achievement information and therefore, cannot monitor performance.
Moderator allocate Strategy (rotation)	Hinders	Comparison (compare specific member performance)	When the group follow the rotation strategy to allocate the group moderator, the compare specific member performance would be hindered. This is because comparison can only be performed if the moderator is aware of members' goal performance.
Moderator allocate Strategy (rotation)	Hinders	Exit procedure (decision maker)	When the group follow the rotation strategy to allocate the group moderator, the exit procedure function to support the decision to ban member would be hindered. This is because the decision to ban a member can only be made if the moderator has knowledge of the member's goal progress or information about member behaviour within the group.
Moderator allocate Strategy (rotation)	Excludes	Feedback (peer to peer progress, self-past progress)	When the group follow the rotation strategy to allocate the group moderator, the feedback function regarding peer to peer progress or self-past performance progress monitoring would be excluded. This is because the moderator would not be privy to such information.

Reinforcement function (reward/penalty)	Supported by	Monitoring system (performance goal achievement, and improvement)	For the moderator to provide reinforcement function, elements from the monitoring system theme, i.e. monitor member goal achievement, or goals improvement would be needed to support the process. This is because providing reward or penalty depends on the moderate's ability to monitor and have knowledge of goal performance and how much the user has improved on their previous performance.
Reinforcement function (reward/ penalty)	Required	Compare (self-past performance, group member performance, specific member performance)	Moderator reinforcement function required functionality or elements from the compare theme. This function would enable the moderator to compare member's self-past performance, compare group member performance or compare specific member performance.
Reinforcement function (penalty)	Supported by	Exit procedure (moderator decision maker by ban member)	For the moderator to execute the reinforcement function, they would need support from the exist procedure function to help them decide whether to provide a penalty such as ban a member.
Moderator feedback (peer to peer progress, self-past, group goals performance, interaction)	Requires	Monitoring system (achieve target performance, self-past performance progress, group goals progress, peer compare progress and member interaction)	Moderator feedback can be provided based on peer to peer progress, self-past progress, group goals performance and interaction. Since feedback cannot be provided without monitoring goal performance progress, the feedback function required elements from the monitoring function theme to enable the moderator to monitor group member progress and interaction.

Reinforcement function (interaction based; performance based)	Required	Monitor system (performance, interaction)	Moderator reinforcement function based on interaction and performance required elements from the monitor system to enable the moderator to monitor members' interaction and performance then provide the reinforcement function based on that information.
Exit procedure (moderator make decision to ban member)	Requires	Moderator monitoring (performance, interaction)	For the moderator to execute the exit procedure functionality, i.e. decision to ban a member, the moderator would require elements such as member interaction and performance from the moderator monitoring function to help gather knowledge of members' performance information.
Moderator authority (membership authority ban member, lock application)	Supported by	Moderator monitoring (performance, interaction)	In order for the moderator authority to ban a member and lock/block the application, the moderator needs the monitor member performance and interaction elements from the moderator monitoring function. This is because before members can be banned or application locked their interaction behaviour and performance information should be considered.
Setting goals (review goals, modify plan)	Requires	Moderator monitor system (performance achievement goals, peer-self progress, group member progress)	For the moderator to review member goals and modify the goals based on the outcome of such review, the moderator required the monitor functionality to help monitor member performance achievement goals, peer-self progress and group member progress then use such information to assess whether a member is

			on the right path to goal achievement and if not devise strategies to help the member achieve goals or improve their progress.
Moderator skills (domain experience)	Supported by	Setting goals (set specific goals, review the goals, discuss to goals attainment, modify plan)	Moderator's skills and experience would enable them to help members set specific goals, review the goals or discuss goals attainment and modify goal achievement plans. If the moderator lacks the skills needed to assist the goal setting process, then goals that are ambiguous, complex or difficult for the member to achieve may be set.
Monitor system (performance, interaction)	Requires	The privacy (profile what to reveal, usage visibility, feedback visibility and who can see the profile)	Monitoring member performance and interaction require elements from the privacy function, i.e. what to reveal on the profile, usage visibility or feedback visibility and who can see the feedback. Knowledge of such information would enable the moderator to know who should access members' usage information and provided feedback.
Monitor system (performance)	Supported by	Tracking system (self-report, peer tracking, automated)	The moderator monitor member performance functionality is supported by elements from the tracking system, i.e. self, peer or automated tracking.
Feedback (source from moderator, peer)	Requires	Compare (set-past performance, group member performance, specific member)	Since feedback cannot be provided without some elements of comparison, the feedback functionality either from peer or moderator required the comparison function. The comparison

			function compares member self-past performance, group member performance or specific member performance.
Exit procedure (moderator decision maker)	Requires	Compare (self-past performance, group member performance)	In order to help the moderator make a decision to ban a member, the exit procedure function would require the moderator to compare a member to their self-past performance or group member performance.
Reinforcement function (reward and penalty)	Requires	Compare (self-past performance, group member performance, specific member)	In order to help provide reinforcement function, knowledge of member performance information is needed; therefore, the comparison function is required. This function compares member self-past performance, group member performance or specific member performance.
Moderator compare (set-past performance, group member performance, specific member)	Requires	Monitoring system (goal achievement performance, goal improvement performance)	The moderator comparison function for comparing user self-past performance, group member performance or specific member performance required monitoring function to help monitor member goal achievement performance and goal improvement performance.
Peer compare (specific member, group member performance,)	Requires	Privacy (profile what to reveal, feedback visibility, who can see feedback the information)	The peer comparison function for comparing performance with a specific member or group members require elements from the privacy function, i.e. members profile what to reveal, feedback visibility, who can see the feedback information.

5.3.1.1 *LIMITATION*

The participants were volunteers which may have biased the sample. The participants self-declared are about their perception of having problem of using online digital media. Also, the participants do not practice peer group in the past, so during the interview, we strive to provide them with a mock design interface that simulates real-world experience, but it is not the same real-world experience. In related to variability design, the participants have never been in a peer group, and most of them use peer group is a sense of WhatsApp, group chat or forum. However, we are asking for more in managing the group, governance, or other design feature that makes it hard to speculate. The other limitation is that some of the preferences that come from the participants are not just about online, which means the online aspect was not the primary aspect for them. It has been better if the participants reflect on the online aspect. However, we would need a different research method design to deal with such a large sample, as a survey to find the variability design factors.

5.4 CHAPTER SUMMARY

This chapter explores the variability spaces of design online peer support groups for people who have problematic behaviour. The finding showed various viewpoints, preferences and recommendation of design online peer group. For example, members can differ in their preferences towards the reward system and how the performance is measured. While some prefer long-term measurement, others prefer more detailed short-term monitoring and rewards. Preferences could also relate to the permission given to the facilitator and their role.

6. CHAPTER 6: QUANTITATIVE ANALYSIS OF ACCEPTANCE AND REJECTION FACTORS

Problematic use of digital media has lately appeared as a severe problem and impacts individuals' daily activity. Also, specific compulsive and obsessive style of use, as well as an over-reliance on digital media, may have negative effects, such as decreased participation in real-life societies, low work productivity, depressive character, and a lack of sleep (Hampton et al., 2011).

There is a small range of digital addiction (DA) prevention, regulation and rehabilitation tools. However, a large body of literature has noted the problematic relationship with technology. Most of the current DA research centres on why individuals become too dependent on social media and how it affects personality traits (Winkler et al., 2013). Few studies have put software design at the core of DA issues, both in promoting and tackling DA, such as digital addiction labels and digital well-being requirements engineering requirements (Ali et al., 2015, Alrobai et al., 2014).

With the advancements in sensing and communication technology and internet connectivity, there has been a boom in software and smartphone apps to aid in behavioural change. It is still uncertain whether these strategies are effective and whether we understand the acceptance and rejection factors from the users' perspective. After some failures and the awareness of related risks, understanding their position and trustworthiness has changed (Alrobai et al., 2016a).

The primary aim of behaviour change theories is to associate the intent to change behaviour with the act of changing behaviour (Webb et al., 2010). Peer support groups are behaviour modification techniques that may be used to overcome addictive habits by giving support and assisting in discouraging relapses (Davidson et al., 2006). Peer support groups are made of individuals with similar values and support and influence each other's actions to achieve shared goals (Alrobai et al., 2016a),

The links between personality traits and the compulsive use of social media applications were investigated (Hsiao et al., 2017). Their results revealed that extraversion, agreeableness, and neuroticism play significant impacts on such compulsive use. The acceptance and rejection of peer support groups as an online social method for behavioural improvement itself may, as a result, be affected by personal and environmental factors. The effect of personality traits, self-control, gender and perceived usefulness, willingness to join, and culture (comparing the UK and Middle Eastern users) on the acceptance and rejection factors of online peer support groups is investigated in this chapter. To accomplish this, we created a survey based on the acceptance and rejection factors discussed in Chapter 4 and gathered information from two focus groups and 16 interviews. The research also included different demographic questions and personality measures (Rammstedt and John, 2007) and self-control (Tangney et al., 2004). We gathered 215 responses.

We present the results of statistical analysis and address the implications for the design of future online peer support groups to combat DA.

In this chapter, the data analysis findings and steps of data processing are set out. The Statistical Package for Social Sciences (SPSS) version 25 is employed to process and analyse data. Key output tables and charts produced by SPSS are presented within this chapter's context. Other outputs are attached in the Appendix 2. The chapter starts with a presentation of data preparation processes, and then a descriptive summary is illustrated numerically and graphically. The inferential analysis section presents linear regression analysis results with significant relationships considered at $\alpha = 0.05$.

6.1 SURVEY STRUCTURE

The survey aims are to validate the qualitative findings of the previous chapters 4. This helps ensure that we established the effects of the factors on the user who has problematic behaviour to accept and reject online peer groups. The survey was distributed online as well as in person. Given the survey's duration, respondents were given a £5 reward. We received 215 completed responses, with 105 (49%) men and 109 (50%) women, and one participant preferred not to respond to the gender question. The participants ranged in age from 17 to 55. The survey began with a validation question to see whether a participant had any health problems as a precondition for participation in the study.

In order to investigate the impact of personal and environmental factors on the acceptance and rejection factors, the survey included questions based on six factors, namely, gender (male/female); country; perceived usefulness of peer support groups; willingness to join a peer support group; the five personality traits (Rammstedt and John, 2007) (extraversion, agreeableness, conscientiousness, neuroticism and openness); and self-control (Tangney et al., 2004). There were 34 questions in the survey divided into five themes of acceptance and four themes of rejection factors. The survey's Likert scale questions are focused on a five-point scale of "agreeing" or "disagreeing". We distributed the survey primarily in the UK, the Kingdom of Saudi Arabia (KSA) and Syria. We received 104 completed surveys from KSA and Syria (55 male/ 49 female, mean age = 26.7, SD = 6.39), and 85 from the UK (35 male/ 50 female, mean age = 24.07, SD = 6.39) while the rest were from other nations, mostly in Europe. This enabled us to examine statistically whether there was a difference between Middle Eastern culture (KSA and Syria) and Western culture (UK). The report published here used a total sample size of 189 people.

6.1.1 PARTICIPANTS' DEMOGRAPHIC INFORMATION

This section seeks to explain the information collected about the participants who participated in the survey and explain the data preparation. The information is based on the six factors used to design the survey questions.

6.2 DATA PREPARATION

The participants' responses to the survey questions into SPSS, the data is received in the form of an SPSS data file (.sav). A general scan of data was performed by running the frequencies procedure in SPSS to find unusual or reversely coded entries. The following variables needed to be edited to be ready for analysis.

- **Gender:** in the questionnaire, respondents are required to give one of three answers: "male", "female", or "prefer not to say". Scanning responses, one respondent is found to choose "prefer not to say". So, it is transformed into a "missing value".
- **Culture (Country):** this variable has 195 answers, a list of 195 countries entered into SPSS across 195 columns that make the analysis very difficult to perform. The 195 columns were grouped into only one column, creating a new variable that refers to "country" or "culture". Also, the 195 countries were grouped into only three categories: (1) Saudi Arabia and Syria, (2) the UK, and (3) All other countries.

6.2.1 PERSONALITY TRAIT SCALE

To measure the participant's behaviour and styles, we used a self-trait questionnaire. This can be used to study the relationship between the big five personalities and the acceptance and rejection factors of an online peer group and the relationship between the big five personalities and the perception of moderator, governance functional and non-functional design of the online peer group. Personality traits define people's characteristics in terms of their behaviour, emotions, and feelings, distinguishing an individual from others (Judge et al., 1999). Personality traits were classified into five factors: openness to experience, agreeableness, extraversion, conscientiousness, and emotional stability. Perkins (2002) measured personality traits by developed a scale of 10 items and the Likert scale questions from "strongly disagree (1)" to "strongly agree (5)" with a five-rating scale. Five traits represent personality: "Extroversion", "Agreeableness", "Conscientiousness", "Neuroticism", and "Openness to Experience". Each of these traits is assessed by two items; see Table 13. Some items were reversely coded using the equation in Table 13. After correcting all reversely coded items, five new variables were created by taking the two items' average measuring each trait (Perkins, 2002).

TABLE 13: PERSONALITY TRAITS QUESTION CODING

Personality Trait	Items	Reversely Coded Items	Equation used to reverse code
Extroversion	Q5_1, Q5_6	Q5_1	New Code = 6 – Reversely Coded Item
Agreeableness	Q5_2, Q5_7	Q5_7	
Conscientiousness	Q5_3, Q5_8	Q5_3	
Neuroticism	Q5_4, Q5_9	Q5_4	
Openness to Experience	Q5_5, Q5_10	Q5_5	

6.2.2 SELF-CONTROL SCALE

Borsari and Carey (2001) measure self-control by developing a scale that includes 13 questions. The scale was designed to determine individuals' ability to maintain self-control through their attitude and behaviour. The self-control scale developed of 13 items and the Likert scale questions from “not at all (1)” to “always (5)” with five rating scale. The reversely coded items are Q6_2, Q6_3, Q6_4, Q6_5, Q6_7, Q6_9, Q6_12, and Q6_13. After correcting the reversely coded items (using the same equation used to correct Q5 reversely coded items, an overall average is taken for the 13 items creating a new variable representing Self-Control.

6.3 DESCRIPTIVE ANALYSIS FOR THE GENERAL INFORMATION

The participants' response to the survey questions were scored, and data was transferred into SPSS. The SPSS was used for descriptive data analysis to determine that the data collection was normally distributed. It also displayed the data in various groups to show the agreed responses in percentage. This section is a descriptive analysis for the general questions and includes numeric statistics and graphical representations. The results in this section are divided into seven sections: demographic information, self-control, personality traits, the usefulness of online peer support group, willingness to joining an online peer support group, acceptance and rejection factors of online peer group variables. Key statistics used to summarize data are frequencies and percentages.

6.3.1 DEMOGRAPHIC AND INFORMATION

The descriptive summary in Table 14 reveals that the sample is divided almost equally between males and females, 49% and 51%, respectively (see Figure 26). A Chi-square test of goodness-of-fit confirmed this to test that all groups contain the same proportion of values. The test was not significant at $\alpha = .05$, indicating that "males" and "females" groups have similar proportions of participants; p -value = .785. The larger proportion of the sample, 48%, come from Saudi Arabia and Syria, while 40% come from the UK. Respondents from other countries represent 12% of the

sample (see Figure 26). A Chi-square test of good-of-fit revealed that participants' distribution among the three groups of countries is not equal, as p-value < .001. However, when the test is re-run for only the two groups: "UK" and "Saudi Arabia & Syria", it revealed that the sample is balanced between both groups; p-value = .167.

TABLE 14: DESCRIPTIVE SUMMARY OF GENDER AND CULTURE - N = 215

Categorical Demographic Variables	Frequency	Percent	Expected Frequency	Chi-Square	Sig.
Gender (Missing = 1)					
Male	105	49.07%	107	.075	.785
Female	109	50.93%	107		
Culture					
Saudi Arabia and Syria	104	48.37%	71.7 (94.5)*	46.167	< .001
The UK	85	39.53%	71.7 (94.5)*	(1.910)*	(.167)*
All other countries	26	12.09%	71.7		

* Second Chi-square test results

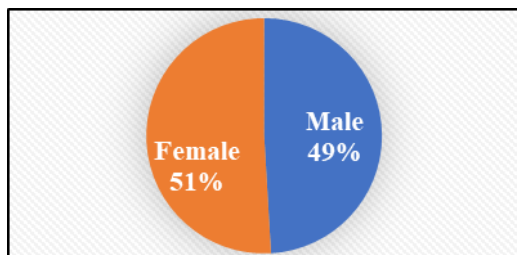


FIGURE 25 GENDER

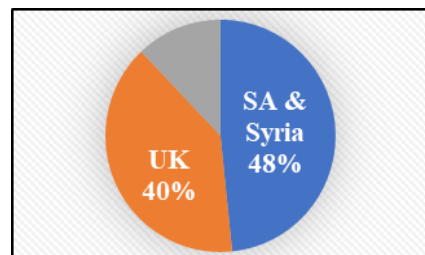


FIGURE 26 CULTURE

The respondents' mean age is 25.88 years with a standard deviation of 6.52, indicating that the sample is young. Age ranges between 16 and 55 years, but most respondents are between 20 and 35, see the histogram in Figure 27. the distribution of age is positively skewed due to some older respondents' existence; over 40 years. Table 15 reports a descriptive summary of "age".

TABLE 15: DESCRIPTIVE SUMMARY OF AGE

Statistics	
Mean	25.88
Median	24.00
Std. Deviation	6.522
Skewness	.996
Kurtosis	1.110
Minimum	16.00
Maximum	55.00

A histogram showing the frequency distribution of age. The x-axis is labeled 'Age' and ranges from 10 to 60. The y-axis is labeled 'Frequency' and ranges from 0 to 50. The bars represent the frequency of respondents in each age group. A normal distribution curve is overlaid on the histogram. Text in the top right corner of the plot area reads: Mean = 25.88, Std. Dev. = 6.522, N = 215.

FIGURE 27 HISTOGRAM OF AGE

6.3.2 PERSONALITY TRAITS

Ten items are used to measure personality, on a five-point Likert scale. Responses are summarised and reported in Figure 28.; frequencies and percentages are calculated and reported. Percentage distribution is presented in Figure 28. The frequency distribution shows a general tendency of agreement among respondents to the items of the personality scale. For example, most respondents believe that 78% believe that they have an active imagination, and 76% believe that they are generally trusting.

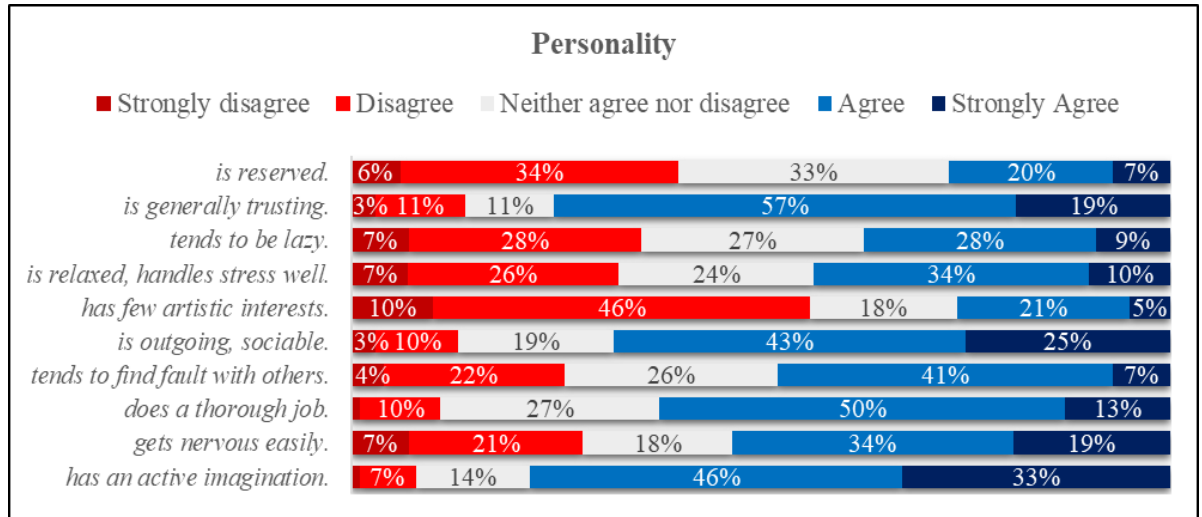


FIGURE 28: PERCENT DISTRIBUTION OF PERSONALITY ITEM SCORES

The mean response for the five personality traits (Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience) range between 3.27 and 3.52, with a standard deviation between 0.653 and 0.944. The skewness and kurtosis values are within the normal range (± 0.5 for skewness), indicating that the five personality traits' distributions are almost symmetric. Investigating the histograms and Normal P-P plots in Figure 29, Figure 30, Figure 31, Figure 32, and Figure 33 show that the distributions are close to normal.

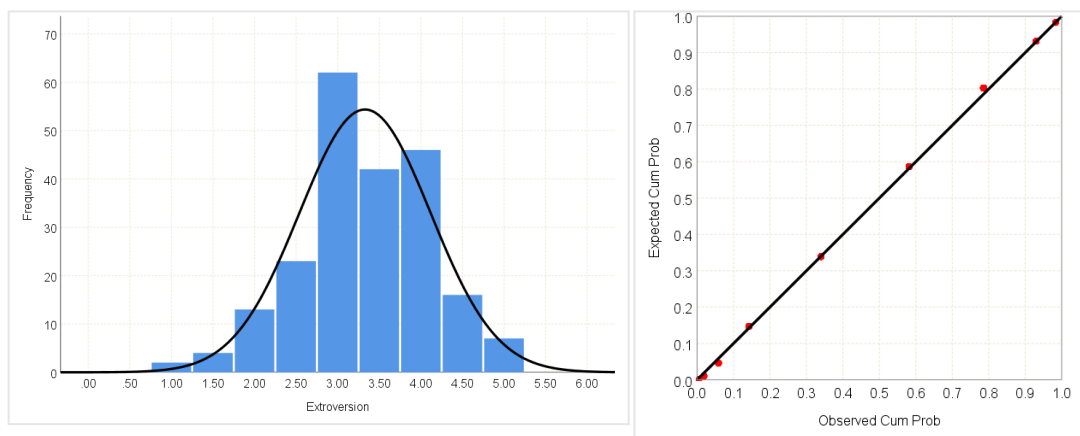


FIGURE 29 HISTOGRAM AND NORMAL P-P PLOT OF EXTROVERSION

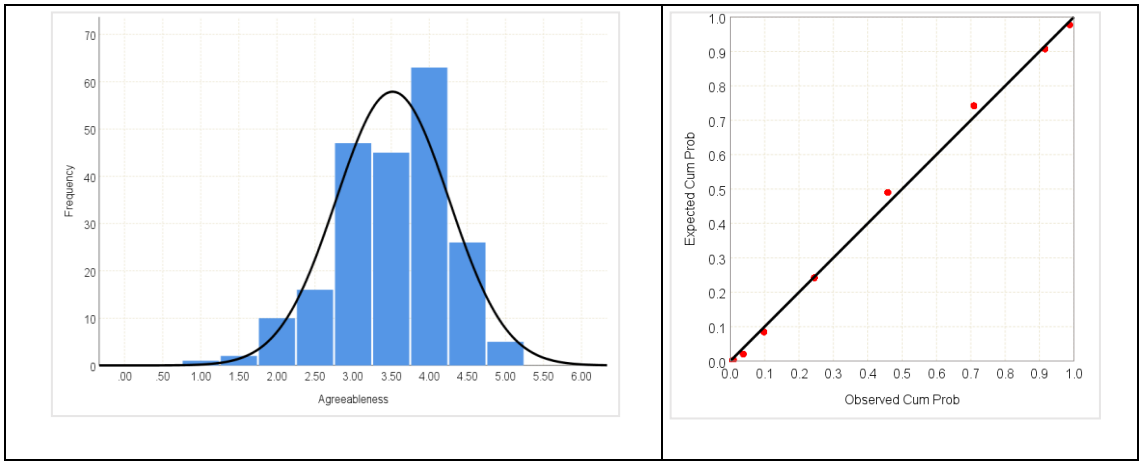


FIGURE 30 HISTOGRAM AND NORMAL P-P PLOT OF AGREEABLENESS

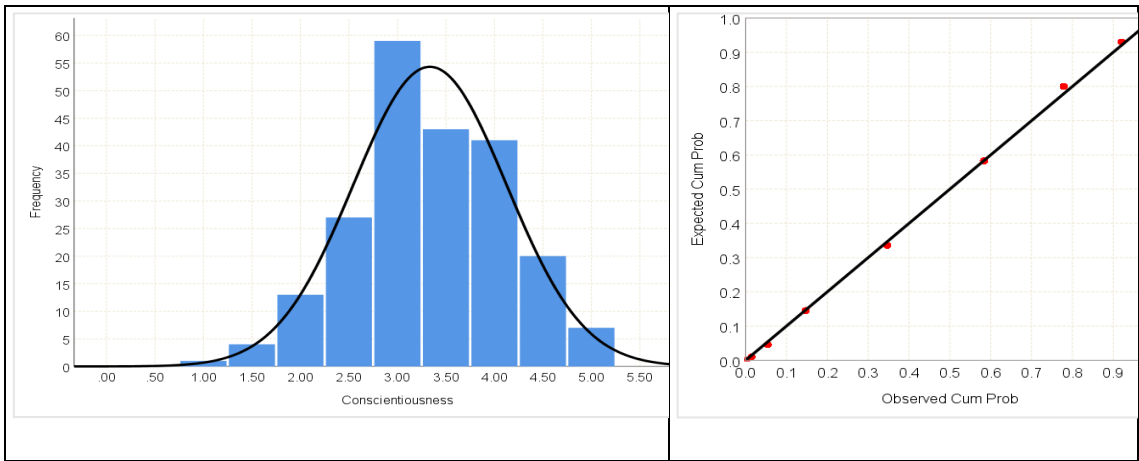


FIGURE 31 HISTOGRAM AND NORMAL P-P PLOT OF CONSCIENTIOUSNESS

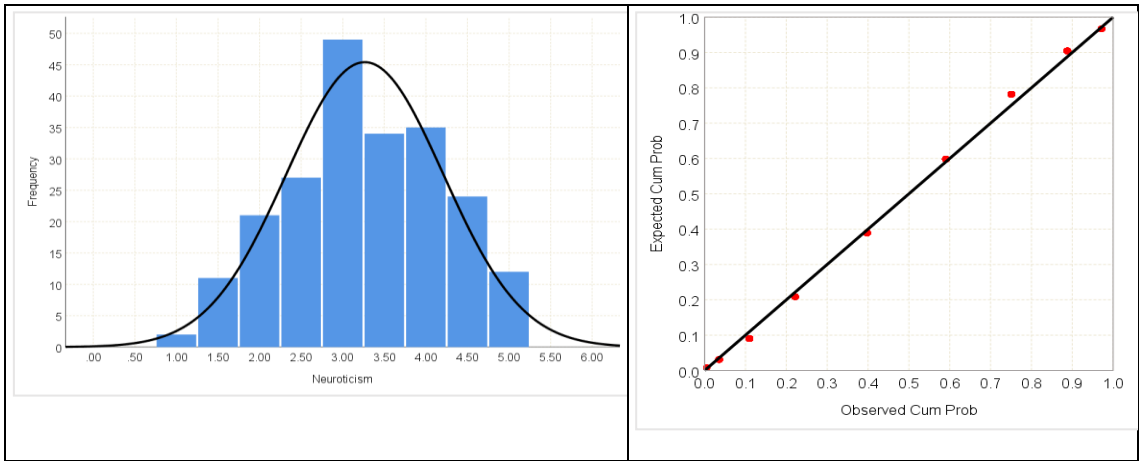


FIGURE 32: HISTOGRAM AND NORMAL P-P PLOT OF NEUROTICISM

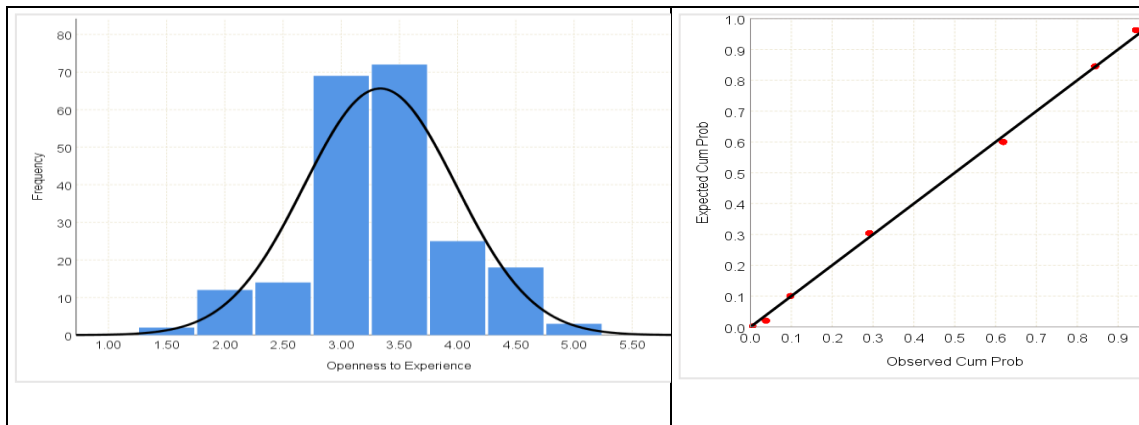


FIGURE 33: HISTOGRAM AND NORMAL P-P PLOT OF OPENNESS TO EXPERIENCE

6.3.3 SELF-CONTROL

Thirteen items were used to measure self-control, the frequencies and percentages are reported and graphically represented in Figure 34. Considering ratings (3), (4), and (5), the results show that the majority of respondents, i.e. 78%, can work successfully towards long-term goals, 77% do not say inappropriate things, 75% do not act without thinking through all the alternatives, 71% say that individuals would say that they have iron self-discipline.

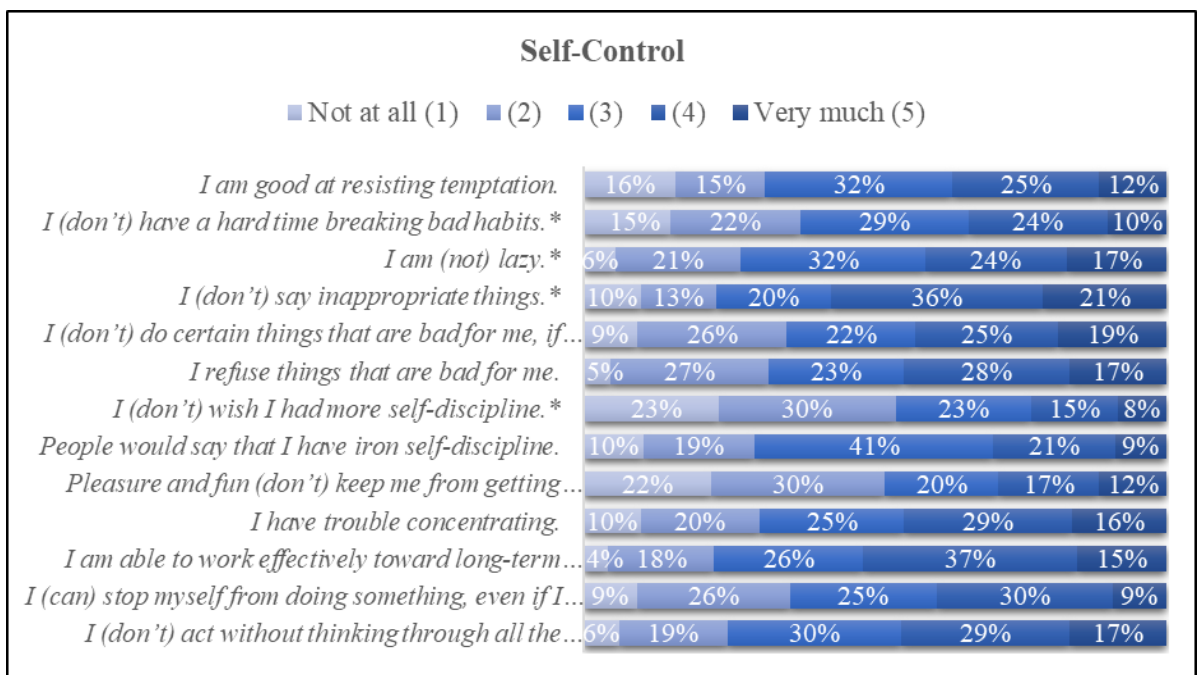


FIGURE 34: PERCENT DISTRIBUTION OF SELF-CONTROL ITEM SCORES

The mean response of self-control is 3.10, with a standard deviation of 0.553, see Table 16. The mean and median values are very close (3.10 and 3.08), indicating that the distribution of self-control is symmetric. Values range between 1.46 and 4.69, with skewness and kurtosis values within the normal range. Along with the shape of the distribution curve plotted in Figure 35, the distribution seems very close to normal.

TABLE 16: DESCRIPTIVE SUMMARY OF SELF-CONTROL – N = 215

Statistics	
Mean	3.10
Median	3.08
Std. Deviation	.553
Skewness	.173
Kurtosis	-.056
Minimum	1.46
Maximum	4.69

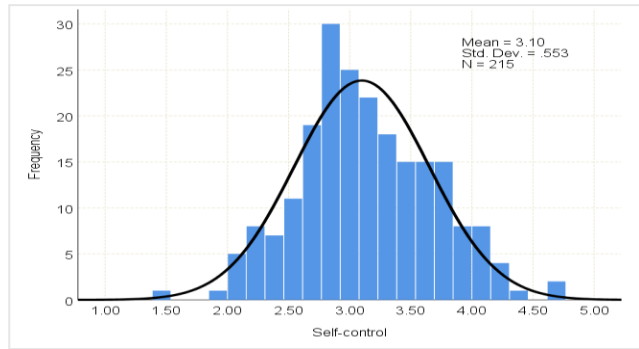


FIGURE 35 HISTOGRAM OF SELF-CONTROL

6.3.4 USEFULNESS OF ONLINE PEER SUPPORT

The frequency distribution for Q7 shows that most respondents find that “online peer support group as an approach to assist members in managing their well-being issues” is useful. 45% of respondents believe that “online peer support group as a method to help members in managing their well-being issues” is at least “useful”, and 77% believe it is at least “moderately useful”, see Figure 36. Only 3% find it “Not at all useful”. That is, 86% find it generally useful: 33% "Useful", 32% "Moderately useful" and 21% "slightly useful". However, 12% find it “very useful”. According to the chi-square test, this distribution does not seem to be balanced; see Figure 37. The test was significant $\chi^2 = 72.23$ with a p-value $< .05$, indicating that the observed distribution is significantly different from the hypothesised one. The observed frequency for the categories “very useful” and “not at all useful” is lower than the hypothesised frequency. However, the other categories’ observed frequency is higher than the hypothesised frequency.

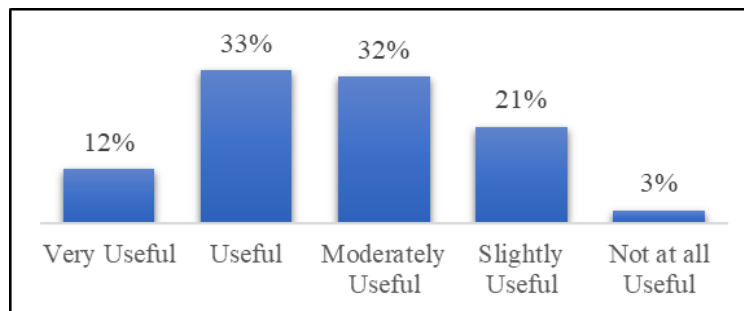


FIGURE 36: USEFULNESS OF ONLINE PEER SUPPORT GROUP AS A METHOD TO HELP MEMBERS IN MANAGING THEIR WELLBEING ISSUES

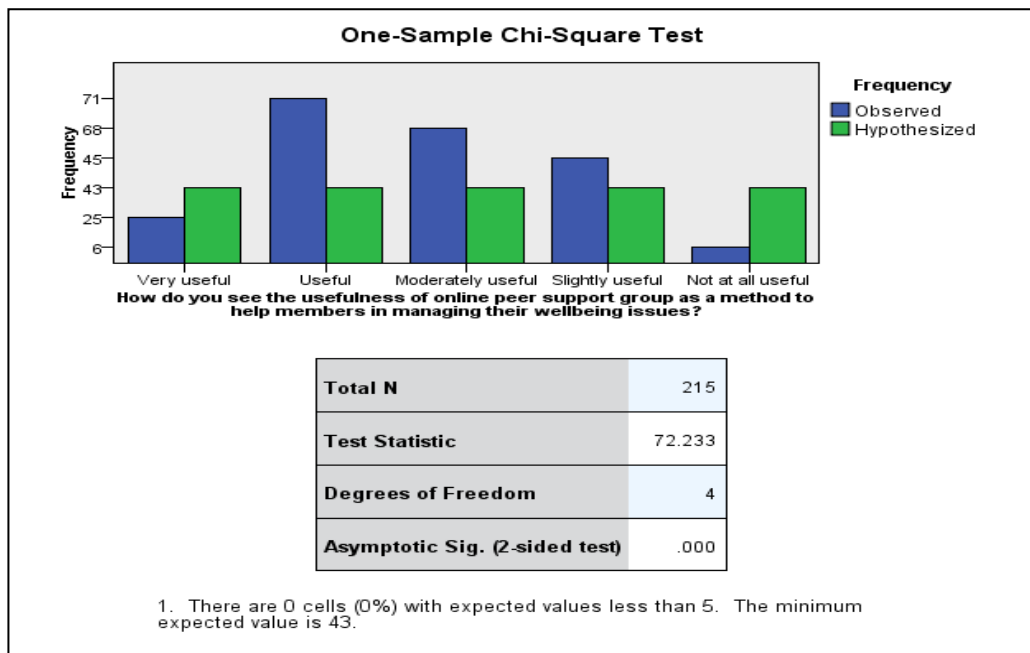


FIGURE 37: ONE-SAMPLE CHI-SQUARE TEST FOR “USEFULNESS OF ONLINE PEER SUPPORT GROUP AS A METHOD TO HELP MEMBERS IN MANAGING THEIR WELLBEING ISSUES”

6.3.5 JOINING AN ONLINE PEER SUPPORT GROUP TO HELP MANAGE A WELLBEING ISSUE (Q8)

More than half, 58% of the sample shows that it is at least “likely” that they join an online peer support group to assist them to manage a wellbeing problem, while 42% show that it is unlikely; see Figure 39. Based on the Chi-square test, this distribution is not balanced. The hypothesis that this distribution fits a hypothesized frequency distribution is rejected, $\chi^2 = 77.70$ with $p\text{-value} < .05$. The bar chart shows that the observed frequency is higher than the hypothesized frequency for the categories “Likely” and “Unlikely”. In contrast, for the categories “Very likely” and “Very unlikely”, the observed frequency is lower than the hypothesized one, see Figure 38.

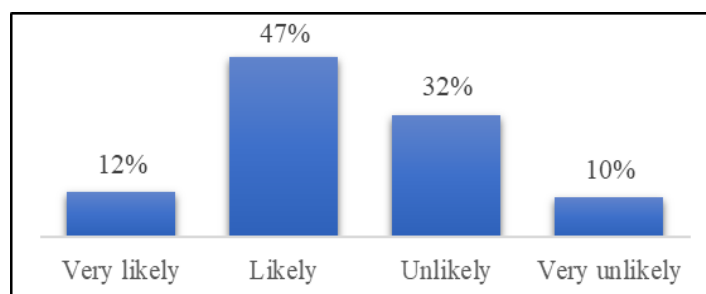


FIGURE 38: JOINING AN ONLINE PEER SUPPORT GROUP TO HELP MANAGE A WELLBEING ISSUE

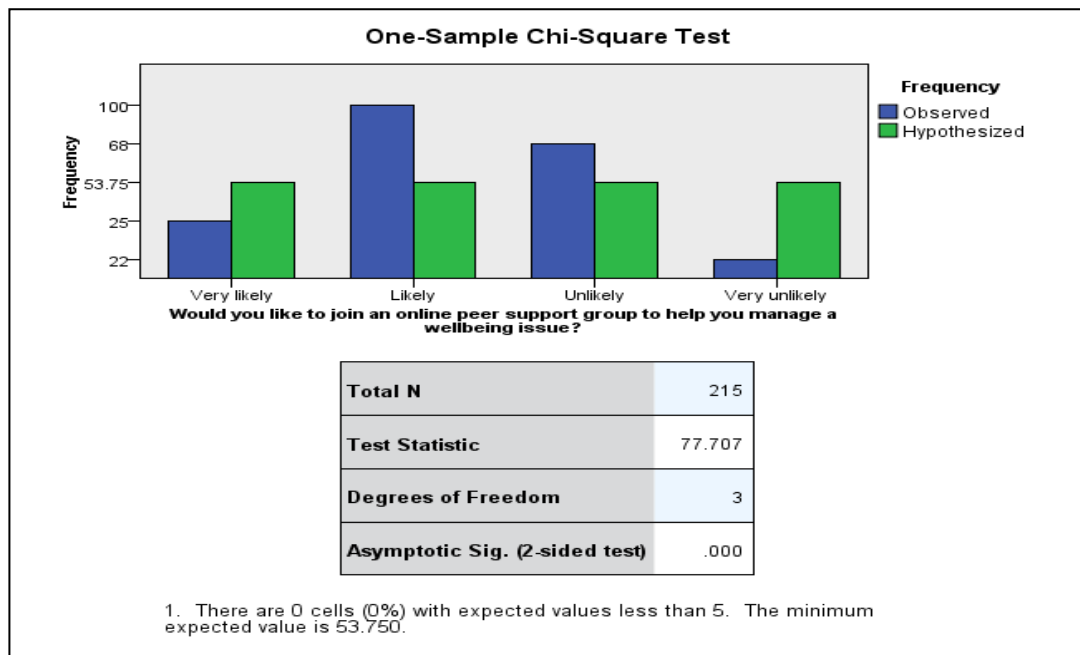


FIGURE 39: ONE-SAMPLE CHI-SQUARE TEST FOR “JOINING AN ONLINE PEER SUPPORT GROUP TO HELP MANAGE A WELLBEING ISSUE”

6.4 DESCRIPTIVE ANALYSIS FOR ACCEPTANCE AND REJECTION QUESTIONS

The qualitative findings have two themes. The first is about acceptance factors to join an online peer group, and the second factor is about the rejection factors to reject online peer group. The qualitative analysis has explored the factors that could affect users’ acceptance and rejection of the online peer group to tackle problematic behaviour. The qualitative analysis has five themes that could affect users to accept joining the online peer group and found four themes that could affect users to reject joining the online peer group. The following section elaborated a description of the statistical analysis of those themes.

6.4.1 DESCRIPTIVE ANALYSIS FOR THE ACCEPTANCE FACTORS

The qualitative analysis indicated that five themes could affect users to accept joining the online peer group. The survey has five questions about the five themes which could affect the user to accept the peer group. These are auxiliary mechanism, prevention and precautionary mechanism, awareness tool, education and support tool. The following sections elaborate more on those themes' descriptive and statistical analysis.

6.4.1.1 AUXILIARY MECHANISM

The quantitative outcome showed that users’ see the online peer group as an auxiliary mechanism. The survey asked four questions about the auxiliary features that could increase users’ acceptance of joining the peer group. Figure 40 summarised the questions and the percentage of agreement. The quantitative outcome found that the majority of respondents, 86%, 85%, and 84%, agreed that information and graphs showed how they are improving to keep them involved and are given

rewards for making progress towards the behavioural goal and for meeting the behavioural target (e.g. points, badges, etc.) would increase their acceptance of online peer support groups, with mean scores of 4.06, 4.01, and 3.98, respectively.

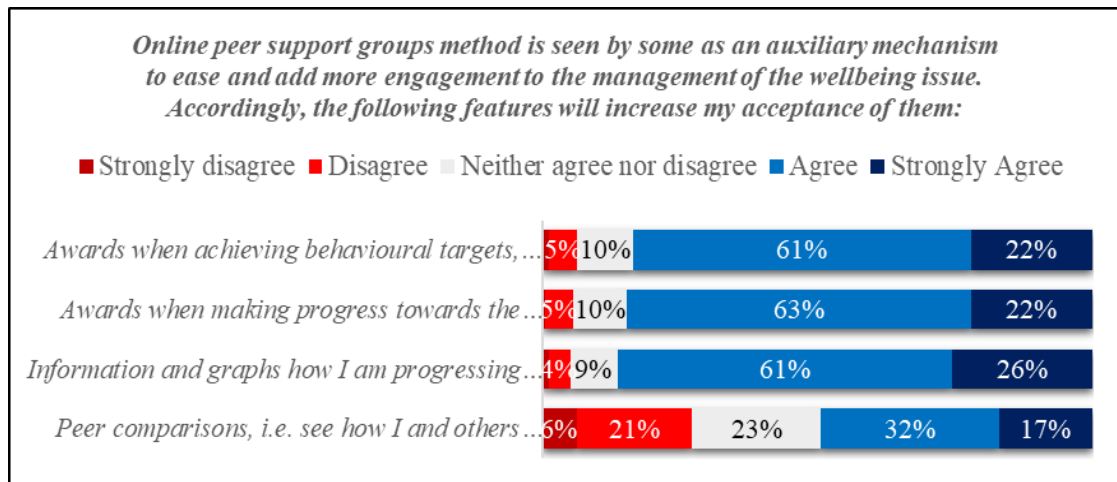


FIGURE 40: FEATURES THAT INCREASE ACCEPTANCE OF ONLINE PEER SUPPORT GROUPS AS AN AUXILIARY MECHANISM

6.4.1.2 PREVENTION AND PRECAUTIONARY MECHANISM

The qualitative analysis found that users’ see the online peer group as a prevention and precautionary tool when the well-being problem starts to appear. In order to increase the acceptance of the online peer group as a prevention tool, the survey has three questions, summarised in Figure 41.

The quantitative analysis found the largest majority of respondents, 91% agreed that guidance, feedback and information sent by moderators focusing on performance and attaining well-being goals would increase their acceptance of online peer support groups as prevention and precautionary tool when the well-being problem starts to appear, with a mean score of 4.09. Also, 78% agreed that measures, limitations and plans set by an approved moderator (e.g. game use limit for compulsive gamers) would increase their acceptance of the online peer support groups as prevention and precautionary tools when the well-being problem starts to appear, with a mean score of 3.91. Furthermore, 69% agreed that peers’ feedback messages about performance and well-being goals would increase their acceptance of online peer support groups as prevention and precautionary tool when the well-being problem starts to appear, with a mean score of 3.65.

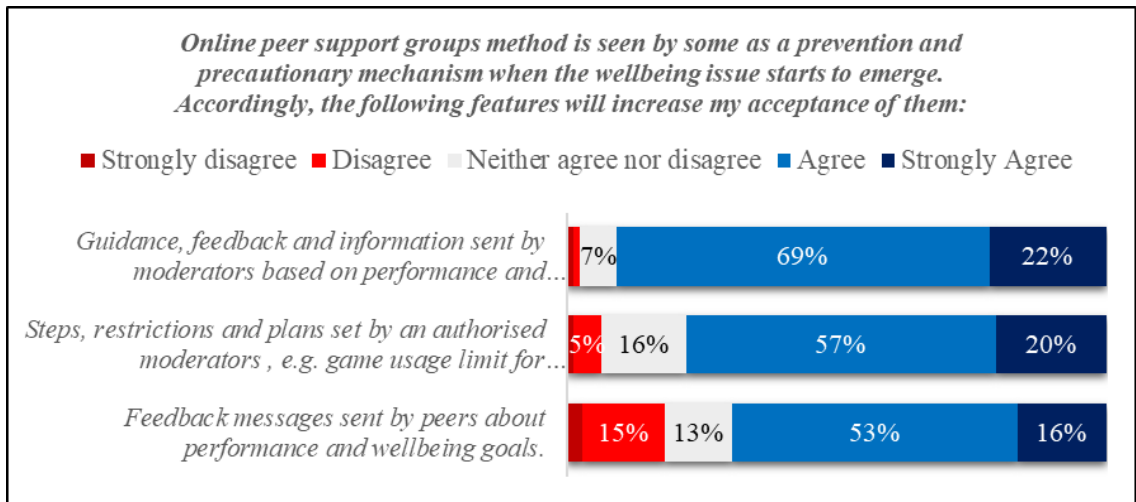


FIGURE 41: FEATURES THAT INCREASE ACCEPTANCE OF ONLINE PEER SUPPORT GROUPS AS A PREVENTION AND PRECAUTIONARY MECHANISM

6.4.1.3 AWARENESS TOOLS

The qualitative found the users seen the online peer group as awareness tools, and three awareness features could increase acceptance of joining the peer group. The survey has three questions about the agreement of the awareness tools that could increase acceptance, and Figure 42 summarised the questions and the percentage of agreement. The statistical analysis showed the top features that increase respondents' acceptance of online peer groups as an awareness tool to help increase awareness and knowledge about the well-being issue and degree of the problem was awareness on goal setting (e.g. how to set and attain goals, and how to prevent deviation from the strategies set to attain the goals), this is agreed upon by 89% of respondents with a mean score of 4.15. Next was self-monitoring (e.g. showing your hourly, daily and weekly performance and progress indicator), agreed upon by 81% of respondents.

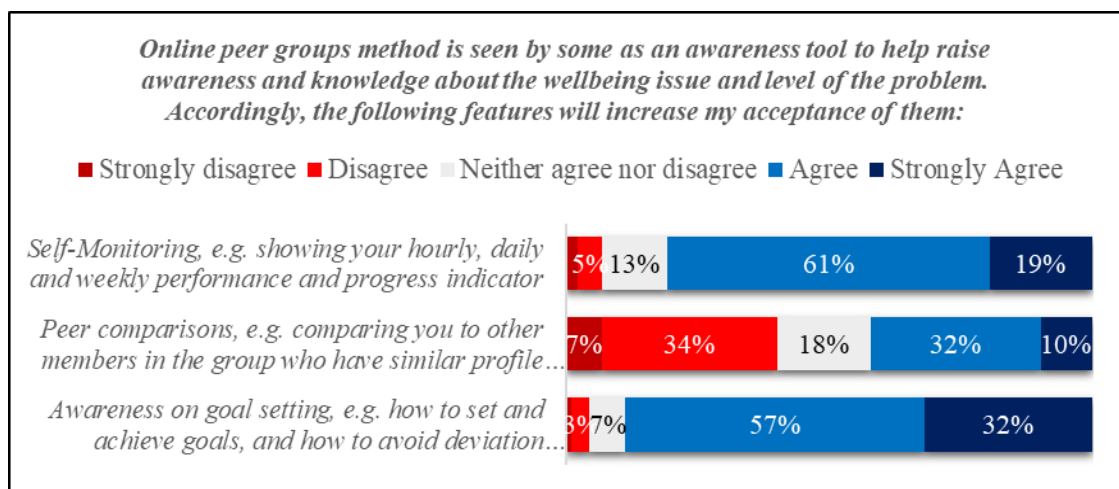


FIGURE 42: FEATURES THAT INCREASE ACCEPTANCE OF ONLINE PEER SUPPORT GROUPS AS AN AWARENESS TOOL

6.4.1.4 EDUCATION TOOL

The qualitative analysis found that some people see peer group as an education platform for learning how to manage the wellbeing problem and change behaviour; four features could increase acceptance of peer group as an education platform. The survey has four questions about the agreement of education platform features, the questions and the percentage of agreement summarised in Figure 43.

The quantitative analysis found that all features listed in Figure 43 are agreed upon by most respondents to increase their acceptance of online peer support group as an educational platform for learning how to manage the wellbeing problem and change behaviour. However, the top feature was environment to learn from moderators who have experience (e.g. best practice in relation to the wellbeing problem) agreed upon by 91%, followed by 90% for the environment to learn how to set attainable and effective goals and plans to achieve them, then 83% for the environment to learn from other peers (e.g., by sharing real-life stories and success strategies in relation to the wellbeing problem), and finally, 69% for the environment where I can learn by acting as a mentor (i.e. when giving advice to other members and when moderating the group).

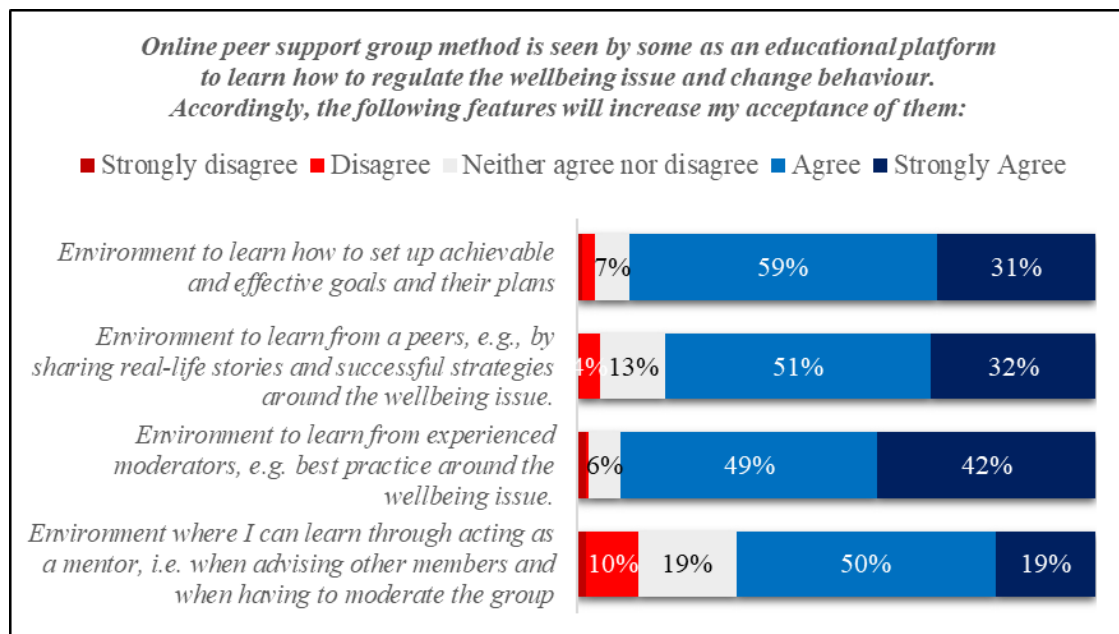


FIGURE 43: FEATURES THAT INCREASE ACCEPTANCE OF ONLINE PEER SUPPORT GROUPS AS AN EDUCATIONAL PLATFORM

6.4.1.5 SUPPORT TOOL

The qualitative analysis found that peer group saw some people as a support mechanism to guide, inspire, and promote the recovery processes of the wellbeing problem. Six features could increase acceptance of peer group as a support tool. The survey has six questions about the agreement of the peer group's design features to be a support tool, the questions and the percentage of agreement summarised in Figure 44.

The statistical analysis found that the majority of respondents, 91% agreed that they accept online peer groups as an environment to get positive and motivating feedback when doing well, and the mean score is 4.23. Similarly, large proportions of respondents ranging between 71% and 89% agreed that they accept online peer groups as the environments listed in Figure 44.

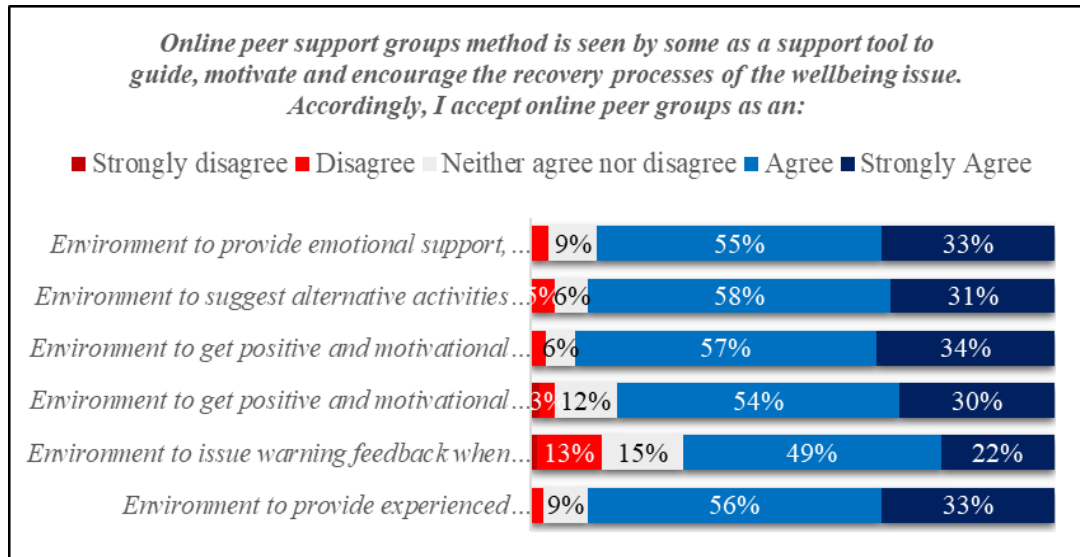


FIGURE 44: ACCEPTANCE OF ONLINE PEER SUPPORT GROUPS AS A SUPPORT TOOL

6.4.2 DESCRIPTIVE ANALYSIS FOR THE REJECTION FACTORS

The qualitative analysis found four themes that could affect users' to reject online peer group. Those factors are unmanaged loss interaction, intimidation, overly judgmental, and unclear membership protocol. The following section elaborates more on the decryption analysis of the quantitative analysis to those themes.

6.4.2.1 LOSS UNMANAGED INTERACTION

There are three agreement questions about rejecting peer group when viewed as a medium for an unstructured and unmanaged interaction, and Figure 45 summarised the questions and the statistical analysis. The analysis found that a group with a weak moderator (e.g., unable to stop or ban members who do not adhere to group norms) was the main factor of rejecting peer group, with an average score of 4.01. Second, 66% agreed that the peer group is rejected if it is a large group as it may not feel like a coherent group, and the mean score is 3.70. Third, 51% agreed that they would reject a group that permits a loose and relaxed rule, such as accepting conversations and interactions that are unrelated to the wellbeing issue, and the mean score is 3.33.

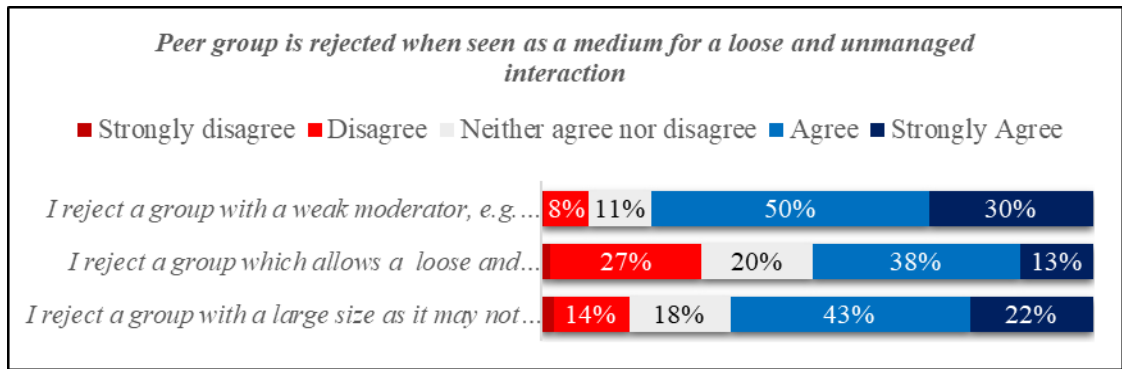


FIGURE 45: PEER GROUP IS REJECTED WHEN SEEN AS A MEDIUM FOR A LOOSE AND UNMANAGED INTERACTION

6.4.2.2 INTIMIDATION

There are three agreement questions about rejecting join the peer group when used as intimidating users in specific modalities, and Figure 46 summarised the questions and the statistical analysis. The analysis found that the majority, 71% of respondents, agreed that they reject a group that imposes harsh penalties, e.g. banning from the group for some time if they repeatedly forget their goals, and the mean score is 3.74. Also, 61% agreed that they would reject a group with harsh feedback (for example, your interaction with peers displays anti-social and destructive patterns, you have been reported for annoying others), and the mean score is 3.65. 59% agreed that they reject a group with negative feedback (e.g. you have repeatedly failed to achieve your target; this is the 5th time this month), the mean score is 3.52.

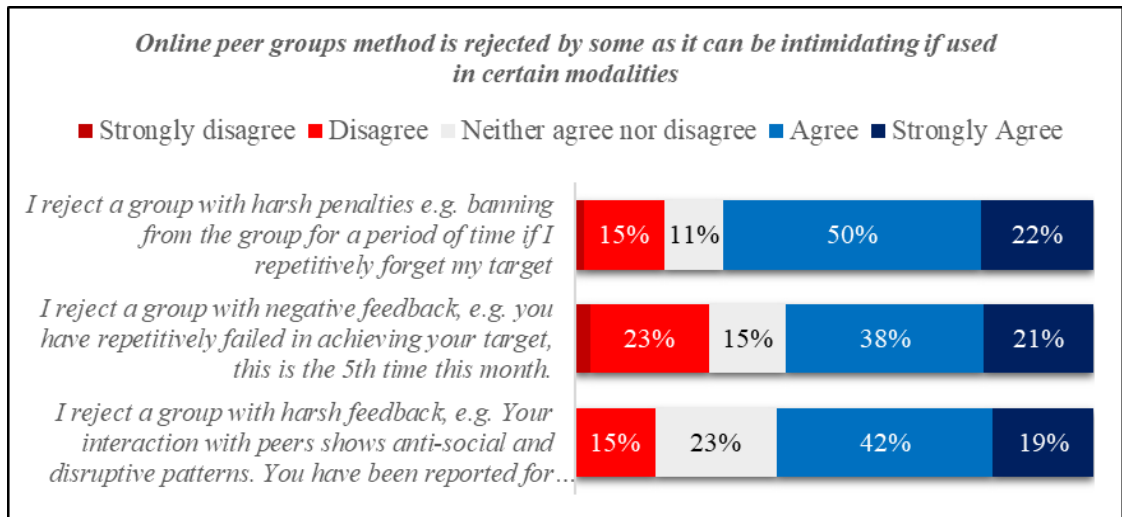


FIGURE 46: ONLINE PEER GROUPS METHOD IS REJECTED BY SOME AS IT CAN BE INTIMIDATING IF USED IN CERTAIN MODALITIES

6.4.2.3 OVERLY JUDGMENTAL

The online peer groups method is rejected by some when viewed as too judgmental, and Figure 47 summarised the questions and the statistical analysis of the overly judgment. The analysis found that the majority 75% of respondents agreed that they reject a group if they are judged by peers who are only online contact (e.g. not real-life interactions); the mean score is 3.90. In addition, 71% decided that they will condemn a group if online judgment extends to other facets

of life by peers who are real-life contacts; the mean score is 3.90. Also, 59% of respondents agreed that they would reject a group if they are judged by online peers who are also real-life contacts; the mean score is 3.61. Only 37% agreed that they would reject a group if the group moderator regularly judged their performance and interaction, even if it this for their benefit, mean score of 2.88.

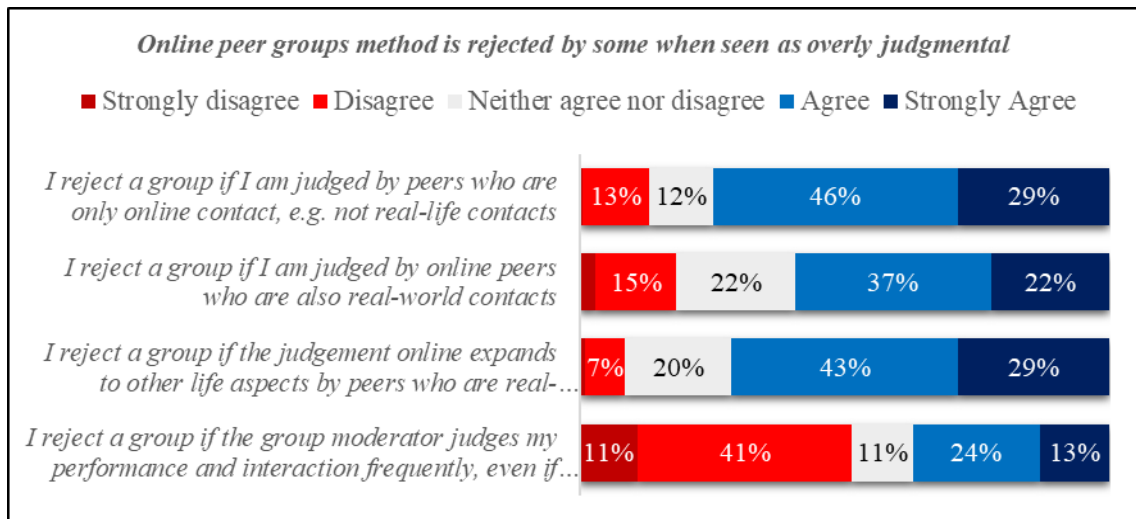


FIGURE 47: ONLINE PEER GROUPS METHOD IS REJECTED BY SOME WHEN SEEN AS OVERLY JUDGMENTAL

6.4.2.4 UNCLEAR MEMBERSHIP PROTOCOL

The survey asked about rejection factors found in the qualitative analysis about unclear membership protocol. The analysis found that respondents did not give high agreement to the statements listed in Figure 48. That is, 42% stated that they reject a group that permits family members to participate, 42% stated that they reject a group if members can leave at any time without notice or explanation, 35% stated that they reject a group if there are conditions to leave the group, such as informing the moderator ahead of time, and 27% stated that they reject a group that enables friends in real-life to participate; with mean scores of 3.10, 3.09, 2.95, and 2.66.

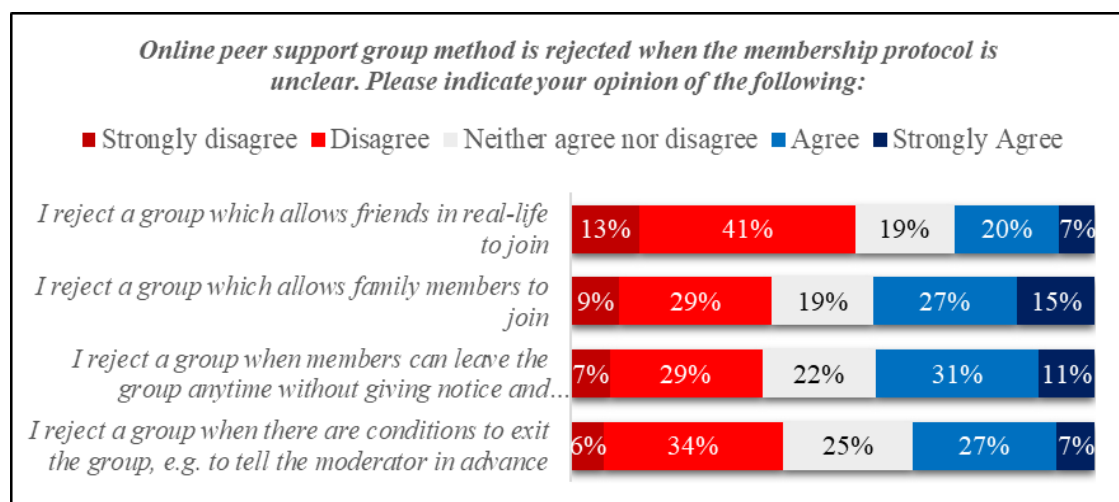


FIGURE 48: ONLINE PEER SUPPORT GROUP METHOD IS REJECTED WHEN THE MEMBERSHIP PROTOCOL IS UNCLEAR

6.5 REGRESSION ANALYSIS

Appendix [2] contains the survey questions about acceptance and rejection. The enter approach was used to perform a sequence of multiple linear regressions. Gender (male/ female); area (UK/ Middle East); perceived utility of peer support groups; willingness to participate in a peer support group; extraversion, agreeableness, conscientiousness, neuroticism, and openness; and self-control score were all predictors in each model. The individual questions used to test attitudes relating to online peer groups' acceptance and rejection factors as recognised within the definition of each model result in the section below as the outcome measure for each model.

Linear regression has been used to determine if the variables of gender, culture, personality, and self-control were significant predictors of the outcome variables acceptance factors, rejections factors and variability design facets of online peer groups platform. The null hypothesis was that there would be no statistically significant ($p < .05$) predictive relationship between the predictor variables and the outcome variables.

6.6 EFFECTS ON ACCEPTANCE FACTORS

Table 17 shows the factors that influence users' acceptance of online peer support groups to tackle DA. Following the elaborated explanations of themes A1 to A4, a series of linear regressions using the enter method were performed, with the outcome measure being the individual questions used to measure attitudes relating to online peer group acceptance factors, as identified in the overview of each model result in the section below.

TABLE 17: ONLINE PEER SUPPORT GROUPS TO COMBAT DIGITAL ADDICTION: ACCEPTANCE FACTORS

Acceptance Theme	Sub-themes
[A1] Accepting online peer groups as an <i>entertainment auxiliary</i>	[A1.1] Provide awards: gamification of performance [A1.2] Peer comparison: to see how I and others do [A1.3] Goal achievement: rewards, information, and graphs of my progress towards the goal
[A2] Accepting online peer groups as a DA <i>awareness tool</i>	[A2.1] Self-Monitoring: show actual usage and performance [A2.2] Peer comparison: benchmarking through others [A2.3] Goal achievement: awareness of how I am achieving goals
[A3] Accepting online peer support groups as an <i>educational tool</i>	[A3.1] Peer learning: learning from others how to improve [A3.2] Moderator role: learning from moderator, learning from acting as moderator [A3.3] Set up goals: learning how to set up SMART goals
[A4] Accepting online peer support groups as a <i>prevention tool</i>	[A4.1] Peer feedback: alert/feedback through peer feedback [A4.2] Moderator feedback: alert/feedback by a moderator [A4.3] Authority: steps and restrictions set by a moderator

[A5] Accepting online peer support groups as a <i>support tool</i>	[A5.1] Provide advice: by experienced moderator; alternatives lifestyle [A5.2] Emotional support: when struggling to avoid relapse [A5.3] Feedback: when performing well and under-performing, sending warnings
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6.6.1 ACCEPTING ONLINE PEER GROUPS AS AN ENTERTAINMENT AUXILIARY. [A1]

The study revealed that there were three non-significant models in this group, that were [A1.1a] awards when attaining the behavioural goals, e.g. points, badges; [A1.1b] awards when moving towards the behavioural goal; [A1.3] knowledge and graphs on how I am improving to keep me involved. The model for [A1.2] peer comparisons was significant, e.g. to see how I and other peers do, predicting 11.9% of the variance ($R^2 = .119$, $F(10,159) = 2.15$, $p = .023$). The only important predictor of this extraversion was ($\beta = .124$, $p < .05$), with a rise in extraversion linked with a rise in agreement concerning the statement.

6.6.2 ACCEPTING ONLINE PEER SUPPORT GROUPS AS AN AWARENESS TOOL [A2]

The study showed that the first model in this group was significant, i.e. [A2.1] Self-Monitoring, e.g. displaying your success and progress predictor on an hourly, daily and weekly basis ($R^2 = .107$, $F(10,159) = 1.89$, $p = .049$), accounting for 10.7% of the variance. In this model, extraversion ($\beta = .089$, $p < .05$) and neuroticism ($\beta = .074$, $p < .05$) were the two significant predictors. There was a rise in agreement concerning this statement as the degree of the personality trait raised. The other two models were not significant in this group. These were [A2.2] peer comparisons, such as comparing you with other group members with a similar profile and problem level; [A2.3] Awareness of the setting of goals, such as how to set and attain targets, and how to prevent deviating from the strategy you set to accomplish them.

6.6.2.1 ACCEPTING ONLINE PEER SUPPORT GROUPS AS AN EDUCATIONAL PLATFORM. [A3]

The study showed that none of the models was significant in this group. These were [A3.1] Environment to learn from peers, such as through sharing real-life experiences and effective well-being strategies; [A3.2a] Environment to learn from seasoned moderators, e.g. best practises on the well-being problem; [A3.2b] Environment where I can learn by serving as a mentor, i.e. when guiding other group members and when the group needs to be moderated; [A3.3] Environment to

learn how to set attainable and successful goals and their strategies. This implies that variations do not influence peer support groups' acceptance as an educational tool in personal and environmental aspects.

6.6.2.2 ACCEPTING ONLINE PEER SUPPORT GROUPS AS A DIGITAL ADDICTION PREVENTION TOOL [A4]

The study showed that none of this group's models was significant; these were [A4.1] feedback messages sent by peers on success and wellbeing targets. [A4.2] Instructions, feedback and information provided by moderators based on success and achievement of wellbeing targets; [A4.3] steps, limits and plans set by an approved moderator, e.g. compulsive gamers' game use limit.

6.6.3 ACCEPTING ONLINE PEER SUPPORT GROUPS AS A SUPPORT TOOL [A5]

The study showed that the first model for [A5.1a] Environment to have season moderators who can advise and direct members to handle the well-being problem was significant ($R^2 = .115$, $F(10,159) = 2.06$, $p = .030$), accounting for 11.5% of the variance. Neuroticism ($\beta = .071$, $p < .05$) was the only significant predictor, with an increase in this personality trait being correlated with an increase in acceptance of this statement. In this group, the remaining regression models were not significant. These were [A5.1b] Environment to recommend alternative activities to substitute and separate me from unhealthy habits and promote well-being; [A5.2] Environment to provide emotional support, for example, when struggling to practise healthy behaviour; [A5.3a] Environment to receive positive and inspirational feedback while performing well; [A5.3b] Environment to receive positive and inspirational feedback even if targets are not met; [A5.3c] Environment to deliver warning feedback when the performance and interaction of members are incorrect. This again indicates that when peer groups are used as sources of information and guidance, influences are limited.

6.6.4 EFFECTS ON REJECTION FACTORS

The factors affecting the rejection of online peer support groups by users to tackle DA are described in Table 18. The elaborate explanations of R1 to R4, a series of linear regressions employing the enter technique, were performed. In each model, the outcome measure was the individual questions utilised to quantify attitudes related to the online peer group rejection factors, as acknowledged in the explanation of each model outcome in the below section.

TABLE 18: ONLINE PEER SUPPORT GROUPS TO COMBAT DIGITAL ADDICTION: REJECTION FACTORS

Rejection Theme	Sub-themes
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[R1] Rejecting online peer support groups when seen as <i>intimidation tool</i>	[R1.1] Negative feedback: dismissive feedback when failing [R1.2] Harsh penalty, e.g. banning and locking out
[R2] Rejecting online peer support groups when seen as <i>overly judgmental</i>	[R2.1] Being overly judged by a moderator [R2.2] Being judged by peers, known and unknown in person
[R3] Rejecting online peer supports group when <i>hosting unmanaged interactions</i>	[R3.1] Weak management [R3.2] Large group size
[R4] Rejecting online peer groups due to <i>unclear membership protocol</i>	[R4.1] Relatedness: group including relatives and friends [R4.2] Exit control: free and uncontrolled exit as well as conditions on exiting the group without considering others

6.6.4.1 REJECTING ONLINE PEER SUPPORT GROUPS WHEN SEEN AS AN INTIMIDATION TOOL [R1]

The model for [R1.1a], i.e. I reject a group with negative feedback, e.g. you have consistently failed to attain your targets, this is the fifth time in this month was significant ($R^2 = .113$, $F(10,159) = 2.03$, $p=.033$), representing 11.3 per cent of the variance. In the model, openness was the only significant predictor ($\beta = -.160$, $p<.05$). As a result, there was a rise in agreeableness and a decline in approval of this statement. The model for [R1.2b] I reject a group with strict feedback, e.g. anti-social and disturbing patterns are revealed by your contact with peers. You have been accused of irritating others was significant ($R^2 = .125$, $F(10,159) = 2.26$, $p=.017$), accounting for 12.5% of the variance. In this model, gender was the only significant predictor ($\beta = .398$, $p <.05$). This indicated that this statement was more likely to be accepted by female participants. In the model [R1.2], I reject a group with strict penalties such as banning from the group for some time if I consistently forget my goal was significant ($R^2 = .163$, $F(10,159) = 3.09$, $p = .001$), representing 16.3% of the variance. In the model, the significant predictors are agreeableness ($\beta = .133$, $p <.05$), neuroticism ($\beta = .145$, $p <.05$) and self-control ($\beta = -.024$, $p <.05$). Acceptance of this statement improved as agreeableness and neuroticism increased, but as self-control increased, this statement's approval decreased.

6.6.4.2 REJECTING ONLINE PEER SUPPORT GROUPS WHEN SEEN AS OVERLY JUDGMENTAL [R2]

Three of the regression models in this category were not relevant, which were [R2.1] I reject a group if my success and interaction are regularly assessed by the group moderator, even if this is to my advantage [R2.2a] I reject a group if I am evaluated by peers who are only online contacts, e.g. not real-life contacts; [R2.2c] I reject a group if the online assessment by peers who are real-life connections extends to other life aspects. The model for [R2.2b] I reject a group if I am evaluated by online peers who are also real-life contacts was significant ($R^2 = .139$, $F(10,159) = 2.55$, $p = .007$), which accounts for 13.9% of the variance. The only important predictor was

gender within the model ($\beta = .557, p < .05$). This meant that women were more likely to accept this statement.

6.6.4.3 *REJECTING ONLINE PEER SUPPORTS GROUP WHEN HOSTING UNMANAGED INTERACTIONS [R3]*

The model for [R3.1a] I reject a group with a weak moderator, such as unable to interrupt or exclude participants who do not comply with group expectations, was significant ($R^2 = .119, F(10,159) = 2.14, p = .024$), which accounts for 11.9% of the variance. In this model, the only significant predictor was conscientiousness ($\beta = .139, p < .05$), with an increase in this trait correlated with an increase in agreement with this statement. The model for [R3.1b] I reject a group that allows for loose and relaxed laws, e.g. allowing discussions and interactions that are not relevant to the problem of well-being, was significant ($R^2 = .132, F(10,159) = 2.41, p = .011$), which accounts 13.2% of the variance. The predictors of conscientiousness ($\beta = .136, p < .05$) and openness ($\beta = -.196, p < .05$) were both significant within the model, with a rise in conscientiousness correlated with a rise in acceptance of this statement. On the other hand, a rise in openness was connected to a decrease in the acceptance of this statement. In the remaining model [R3.2], I reject a large group as it did not feel like a coherent group was not significant.

6.6.4.4 *REJECTING ONLINE PEER GROUPS DUE TO UNCLEAR MEMBERSHIP PROTOCOL [R4]*

The study showed that none of the models in this group was significant, which were [R4.1a] I reject a group that enables real-life friends to join; [R4.1b] I reject a group that enables family members to join; [R4.1b] I reject a group that enables members of your family to join; [R4.2a] I reject a group when members may leave the group without providing notice and clarification at any time; [R4.2b] I reject a group when there are circumstances to leave the group, e.g. to warn the moderator in advance.

6.7 DISCUSSION

Most regression models were not significant in terms of acceptance factors, and those that were only explained a relatively small amount of the variance. Personality characteristics like extraversion and neuroticism were the most important predictors in such models. These occurred in the expected direction, such as a rise in extraversion correlated with peer group acceptance to improve engagement in handling a wellbeing problem.

Several significant regression models were under the rejection factors, but they only accounted for a small amount of the variance when these were significant. The fact that there are more significant models and predictors relating to rejection factors than acceptance factors may be due to the reactance effect. (Brehm and Brehm, 2013), in which people react adversely to being told that they are not allowed to perform something. Comparable to the significant acceptance model, personality traits were among the significant predictors. In many models relating to group

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judgment, gender was a significant predictor. Female participants were found to be more likely to dismiss statements that could lead to social judgment. According to research, the relationship between gender and the use of peer groups has been discovered to be complex (Matud et al., 2003). However, it could be argued that this result is consistent with the general finding that women use social support systems more than men. This is because a peer group situation that involves an overt and trackable judgment of others can be viewed as a threat to group harmony, undermining or damaging the social support network.

In all of the significant regression models, culture was not a significant predictor. This was surprising since many cultural dimensions could be important to the peer group structure and function. This includes factors like power distance, individualism, and the need to escape uncertainty (Mora, 2013). This can recommend that online peer support environments are not exposed to cultural pressures in the same way that offline groups are, while research in both domains is minimal. Suppose culture is not an influential factor in online peer support groups' acceptance and rejection factors. This is significant in this case since it proposes that techniques focused on online peer support could be applied across cultures.

The descriptive analysis of acceptance factors showed the percentage of those who agree and disagree with the acceptance models. There were a significant number of responses that agree on the acceptance factors. In the accepted online peer group as an auxiliary mechanism, the analysis showed that most responses agree that the model provides awards when achieving behavioural targets and provides awards when achieving goals and peer comparison. Also, in terms of accepting online peer groups as a prevention tool, the descriptive analysis indicated that most responses agree that the moderator has authority and feedback from peer and moderator. Concerning accepting online peer groups as a *DA awareness tool*, the analysis indicated that more than 80% of responses agree on self-monitoring and goal achievement. However, the analysis showed that 42% of responses agree, and 41% disagree with the peer comparison model. Regarding the accepted online peer support groups as an *educational tool*, the descriptive analysis indicated most responses agree on peer learning, learning from moderator role, learning from acting as moderator, and learning from setting up goals. Moreover, accepting online peer support groups as a *support tool*, the analysis indicated more than 70% of responses agree on providing guidance by an experienced moderator; alternatives lifestyle, emotional support when struggling to prevent relapse and feedback when performing well and under-performing, as well as sending warnings.

The descriptive analysis determined the percentage of agreement and disagreement of the online peer group's rejection factors. In terms of the descriptive analysis of the rejection online peer group when seen as an *intimidation tool*, the analysis showed that more than half of responses agree to reject the harsh penalty and negative and harsh feedback. The descriptive analysis of

rejecting the group to be *overly judgmental* indicated that more than half of the responses agree on rejecting being judged in person by peers, both known and unknown, and disagreeing being excessively judged by a moderator. Moreover, the analysis of the rejection factor of *hosting unmanaged interactions* showed that the majority of the responses reject the weak management and large group size. The percentage responses of the rejecting group due to *unclear membership protocol*, the analysis showed 54% of responses disagree with the model reject the group, including a friend. 42% of responses agree to reject the group, including relatives, and the exit from the group to be uncontrolled; around 36% of responses disagree with those models. The responses show that 40% disagree with the model, i.e. I reject a group when there are conditions on exiting the group without considering others, and 34% of responses agree with these models.

6.8 CHAPTER SUMMARY

This chapter describes the statistical analysis of the data gathered from the survey. The survey questions designed to validate the qualitative finding on acceptance and rejection factors explored in chapter 4. Also, using regression analysis to gain a better understanding and measure the effect of gender, culture (UK, Middle East), perceived usefulness of peer support groups; willingness to join a peer support group; the five-personality trait; and self-control on online peer groups acceptance and rejection factors.

7. CHAPTER 7: QUANTITATIVE ANALYSIS OF DESIGN VARIABILITY

An increasing number of studies are being conducted on using technology to tackle problematic behaviour and improve wellbeing. With advancements in sensing technologies and mobile devices, as well as widespread internet access, developed opportunities for employing technology to support behavioural change and self-regulation processes in a more intelligent, contextualised, and situation-aware manner. Online peer groups are a form of technology-supported behaviour awareness software intended to provide peer support, counselling, a motivating and learning atmosphere, and ambivalence lessening through sharing and hope installation. Online peer groups are a synthesis of different influence techniques, including peer pressure, commitment and goal setting, surveillance, and authority through moderator or caregiver. This means that gender, personality traits, community, and self-control can all impact on online peer groups' governance, design, acceptance, and rejection. Peer groups are often moderated to avoid unwanted negative interactions. Owing to excessive peer emotional reinforcement, they can become a platform for learning or increasing harmful behaviours, normalising the problematic behaviour and decreasing the sense of culpability for committing it. (Matthews et al., 2016).

Depending on the personal and environmental context, different methods and techniques are used to inspire and influence behaviour. Factor, e.g. age, personality traits, gender, and culture have all been investigated, and such variations have been discovered. Orji and Mandryk (2014) investigated the influence of culture on the persuasive intervention in the context of healthy eating behaviour change software and the role of gender and age groups as regulating factors.

Also, Orji et al. (2015) investigated the influence of gender and age on the six principles of influence suggested by (Cialdini, 2007) and showed major differences. Females are more receptive to most of the influence strategies than males, according to their findings. Alkış and Temizel (2015) investigated the association between personality traits and the efficacy of Cialdini strategies and significant variations were found. For example, people with high agreeableness (one of the Big Five personality traits model (Rammstedt and John, 2007) are more likely to be influenced by others views whether peer, i.e. social proof, or authority (two of Cialdini strategies (Cialdini, 2007)).

In the previous Chapter 5, the qualitative findings explored the prominent factors from peer groups members perspective around the moderator role, functional governance, and non-functional governance. In this chapter, we conducted a survey to validate the qualitative findings in chapter 5 with a sample of 215 participants. This chapter discusses how their personal and cultural attributes may influence that perception. This is to aid the engineering of online peer group applications, as well as the governance strategies and configuration of such platforms. As a method, we used a quantitative approach to investigate the effects of gender, self-control,

personality traits, community, and perceived usefulness and willingness to join the group. The chapter begins with a survey structure, followed by a descriptive summary illustrated numerically and graphically. Inferential analysis section presents the results of linear regression analysis with significant relationships considered at $\alpha = 0.05$.

7.1 SURVEY STRUCTURE

The survey aims are to validate the qualitative findings of the variabilities design factors for an online peer group described in chapter 5. This helps ensure that we established the factors that would affect users' perception of online peer group features such as moderator and their role, functional and non-functional features. To explore the influence of personal and environmental aspects on the perception of moderator, functional and non-functional governance the survey comprised questions around six aspects, i.e. gender (male/ female); country; perceived utility of peer support groups; willingness to join a peer support group; the five personality traits (Rammstedt and John, 2007) (extraversion, agreeableness, conscientiousness, neuroticism and openness); and self-control (Tangney et al., 2004). The survey comprised 29 questions around the six themes of moderator roles based on the qualitative study's findings, 30 questions around the four themes of governance functions and 24 questions around the four themes of governance non-functional. The survey Likert scale questions are centred on "agreeing" or "disagreeing" with five rating scales. However, the governance function has eight questions the Likert scale questions are centred on "important" or "not important" with five rating scale. Chapter 4 discussed in detail the survey samples and data preparation processes.

7.2 DESCRIPTIVE ANALYSIS

The qualitative findings in chapter 5 explored three themes of the online peer group's design requirements: moderator role and functional and non-functional governance function. The survey questions designed based on the qualitative findings in Chapter 5; the following sections describe the descriptive analysis of the survey questions.

7.2.1 GOVERNANCE FUNCTIONAL QUESTIONS

The qualitative finding in chapter 5 indicated that the governance functional theme has four sub-themes. The survey questions covered all the sub-themes. However, the requirements features were explored from the qualitative study were many, so the survey designed to cover the variabilities requirements of design online peer group. The survey has 30 questions around the governance functional themes which are comparisons, reinforcement function, feedback and setting goals. The comparisons and the reinforcement function the Likert scale questions are centred on "important" or "not important" with five rating scale and the goal setting and the feedback the Likert scale questions are centred on "agreeing" or "disagreeing" with five rating scale. The question about the comparisons on the online peer group is: *online peer support groups*

can provide comparisons and bench-marking to members. How do you consider the importance of seeing the following in it?

The graphically represented in Figure 49, shows that the listed components are of great importance for most respondents. Respondents showed that the most important for them was “Performance Reports”. 81% of respondents stated that Performance Reports are at least “important”, with a mean score of 1.95. 68% of respondents also stated that “how the group whole is performing” is at least “important”, with a mean score of 2.25. Finally, 58% of respondents stated that “specific members performance” is at least “important”, with a mean score of 2.57.

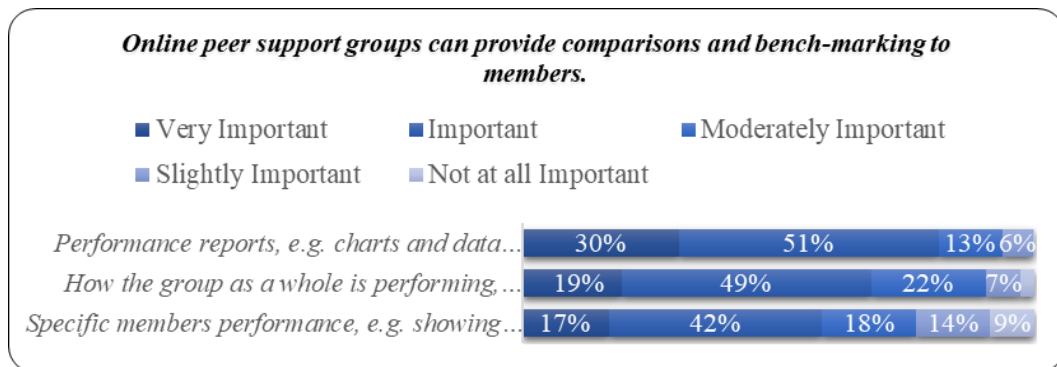


FIGURE 49: ONLINE PEER SUPPORT GROUPS CAN PROVIDE COMPARISONS AND BENCH-MARKING TO MEMBERS

The reinforcement function question is *online peer support groups can be equipped with performance reinforcement function. how do you consider the importance of the following?*

The most important function in respondents’ opinion is “Socially recognising good performance”; that is, 90% stated that it is at least “moderately important”, with a mean score of 2.26. Similarly, 84% of respondents stated that “adjusting the score and level of members based on performance and interaction” is at least “moderately important” with a mean score of 2.48. Although “showing comparisons with other members performance” is the least important function in the respondents’

view, it is still seen at least “moderately important” by the majority, 62% with a mean score of 3.01. A detailed overview can be studied in Figure 50.

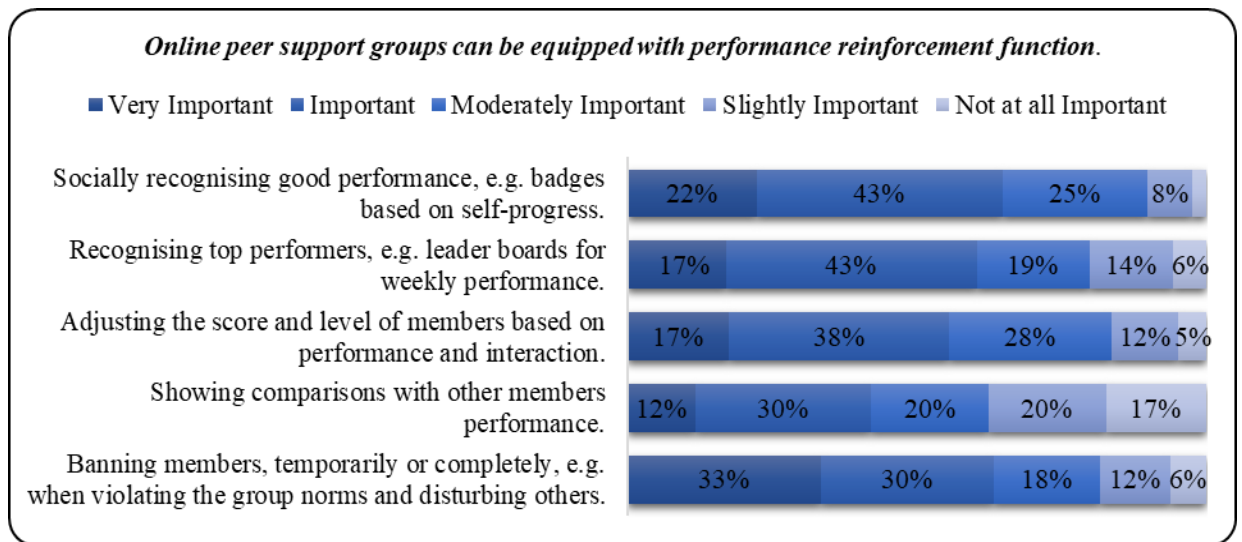


FIGURE 50: ONLINE PEER SUPPORT GROUPS CAN BE EQUIPPED WITH PERFORMANCE REINFORCEMENT FUNCTION

The following questions are designed to explore what participants would like to see in the design feedback subject, source, communication channel and feedback framing in the online peer group. The survey asked what the participants like in terms of setting performance goals. The graph represented in Figure 51 showed the survey questions and respondents’ opinion that they like to see feedback subject in the online peer support group’s platforms. The larger proportion of respondents 87% like to set short-term goals, e.g. daily or weekly goals with a mean score of 4.13. However, 75% of respondents like to set long-term goals, e.g. monthly and seasonal goals with a mean score of 3.90. Also, between 66% and 67% of respondents like to set collective goals, they like the moderator involvement in setting goals, and like to set up goals by themselves.

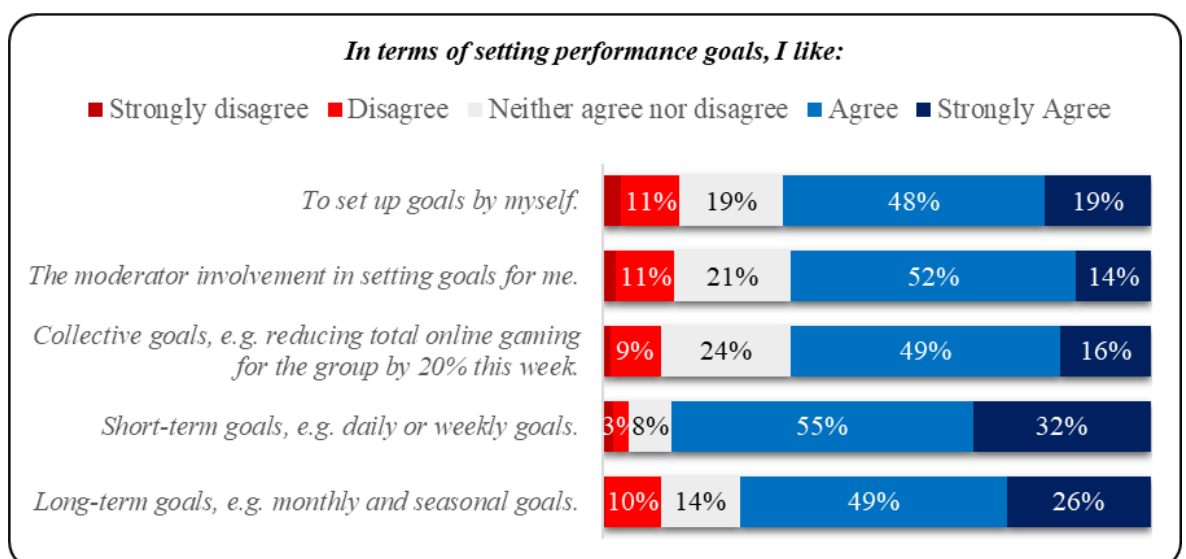


FIGURE 51: FEEDBACK SETTING (SETTING PERFORMANCE GOALS)

Concerning the performance feedback source, the survey has questions regarding the participant feedback source, and Figure 52 showed the questions and respondents' responses. Respondents like feedback coming mostly from the group moderator, 84% with a mean score of 4.11. The second source of performance feedback that 78% of respondents like is the software, e.g., charts based on my stored data with a mean score of 3.97. Also, 61% of respondents like to get performance feedback from peer members with a mean score of 3.42.

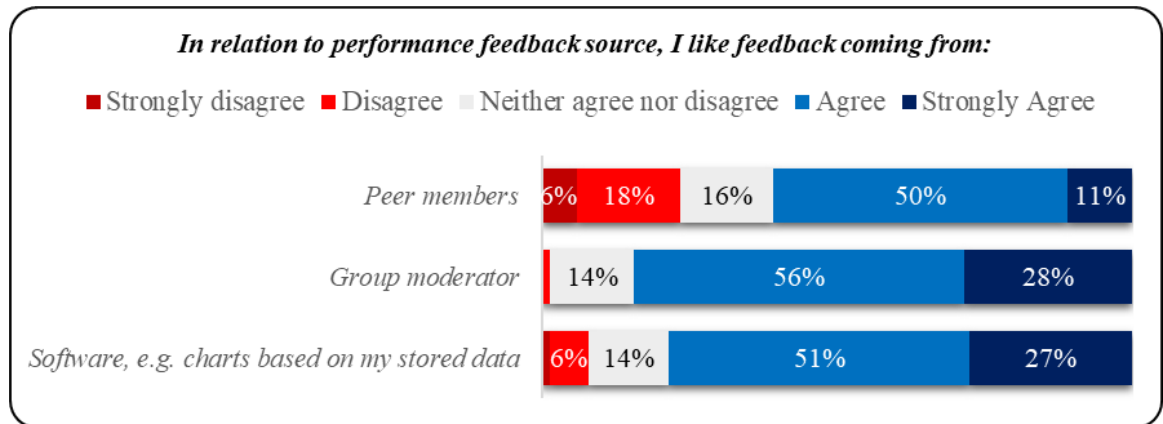


FIGURE 52: PERFORMANCE FEEDBACK SOURCE

Concerning the subject of the feedback, the survey has questions regarding the feedback subject, and the graphically represented in Figure 53 showed the questions and the respondents. Most respondents 91% like feedback on achieving short-term goals; the mean score is 4.08. Also, 86% of respondents like feedback on how their status compares with their status when they joined the group, and how they achieve long-term goals with mean score of 4.27 and 4.12.

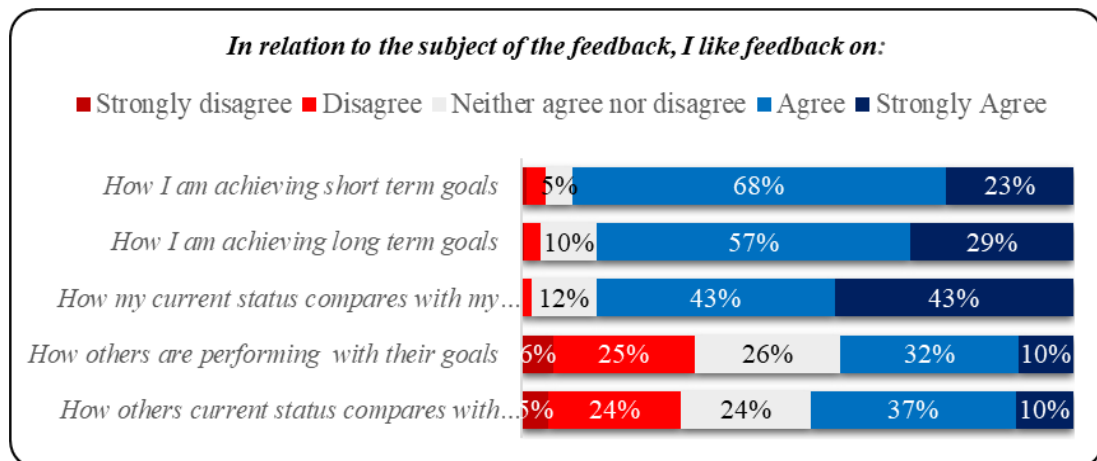


FIGURE 53: THE SUBJECT OF THE FEEDBACK

Concerning communicating the feedback, the graphical representation shown in Figure 54 presented the questions. Most respondents 82% like to receive feedback via one-to-one chat with the moderator; the mean score is 4.11. Following, 74% like to receive feedback via text reports detailing their performance, the mean score is 3.87. Also, 67% like to receive feedback via text-based communication; the mean score is 3.67. They (65%) also like to receive feedback via automated software, i.e. automatically generated and communicated; the mean score is 3.59.

The least method respondents like their feedback to be communicated through is frequent messages, e.g., hourly or several times a day, as only 30%; mean score is 2.80. Also, 39% like to receive feedback via non-verbal cues, e.g., emoji and change in the colour scheme; the mean score is 3.00.

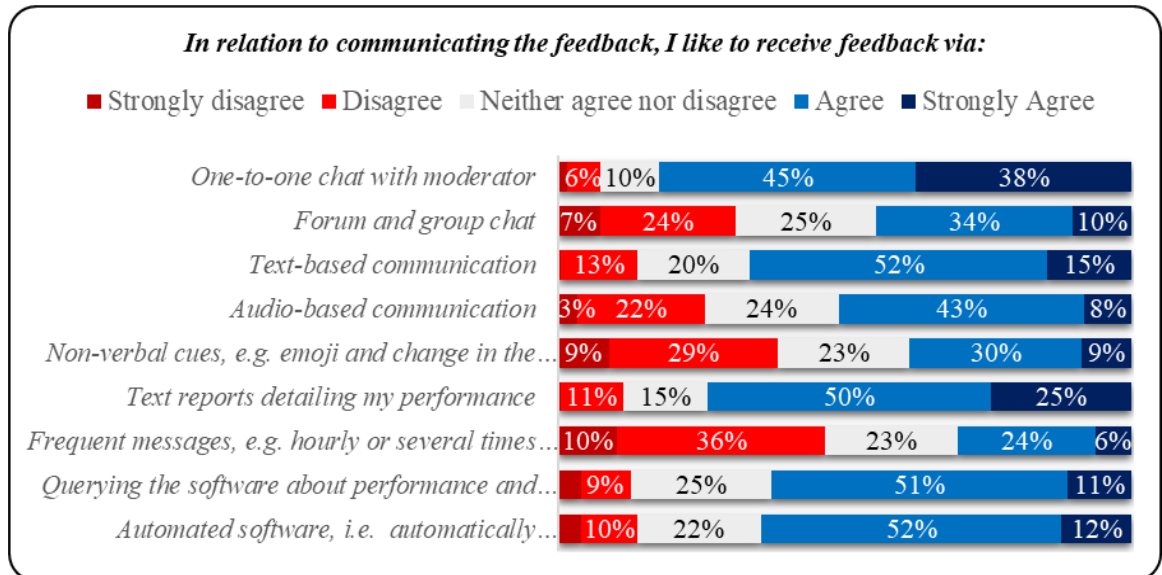


FIGURE 54: COMMUNICATING THE FEEDBACK

In terms of the feedback framing and tone, the graphical representation shown in Figure 55 presented the questions asked and the participants' responses. The majority of respondents 88% like to receive feedback with an encouraging tone. 87% like to receive feedback which mentions both positive and negative sides, the mean scores of 4.25 and 4.29. However, 65% like to receive feedback which focuses on their positive side, the mean score is 3.67. The minority 42% like to receive factual and neutral feedback, i.e. facts and numbers, with no tone in it, the mean score is 3.15.

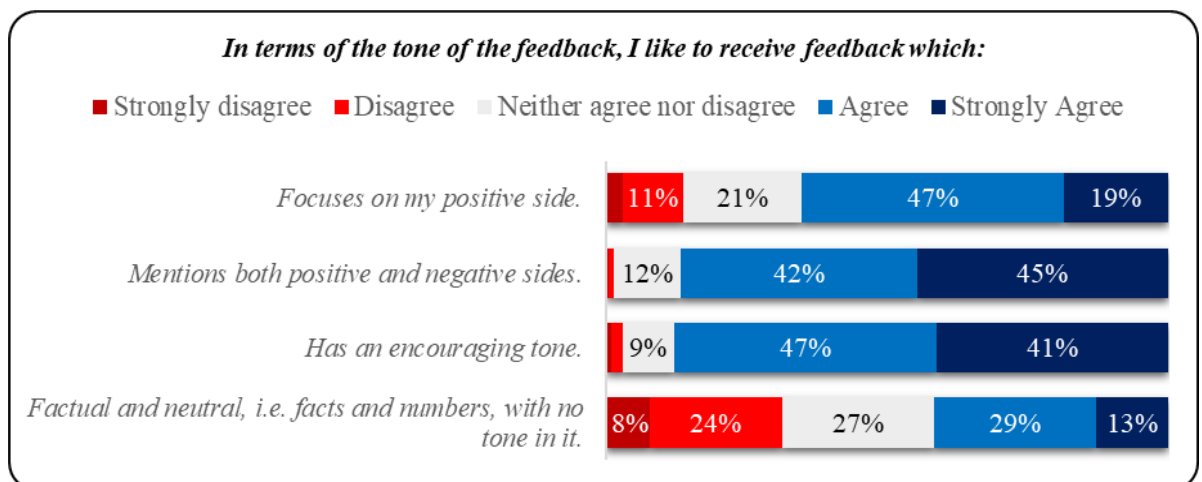


FIGURE 55: THE TONE OF THE FEEDBACK

7.2.2 NON-FUNCTIONAL GOVERNANCE SURVEY QUESTIONS

The qualitative analysis in chapter 5 showed that one of the design requirements to online peer group is non-functional governance requirements with four sub-themes. The survey includes 24 questions that covered the various requirements for non-functional governance explored from the qualitative study. The questions around the four themes of governance non-functional are Exit, privacy, tracking system and membership criteria. The Likert scale questions are centred on "agreeing" or "disagreeing" with five rating scales. The question about the tracking system on the online peer group is "how do you prefer the performance tracking to be implemented"?

From the results reported in Figure 56, "how do you prefer the performance tracking to be implemented"? The majority of respondents, 67% prefer the performance tracking to be hybrid implemented, i.e. based on self-reports and sensors, the mean score is 3.69. Also, 65% of respondents prefer it to be automated through sensors and computing devices; the mean score is 3.62.

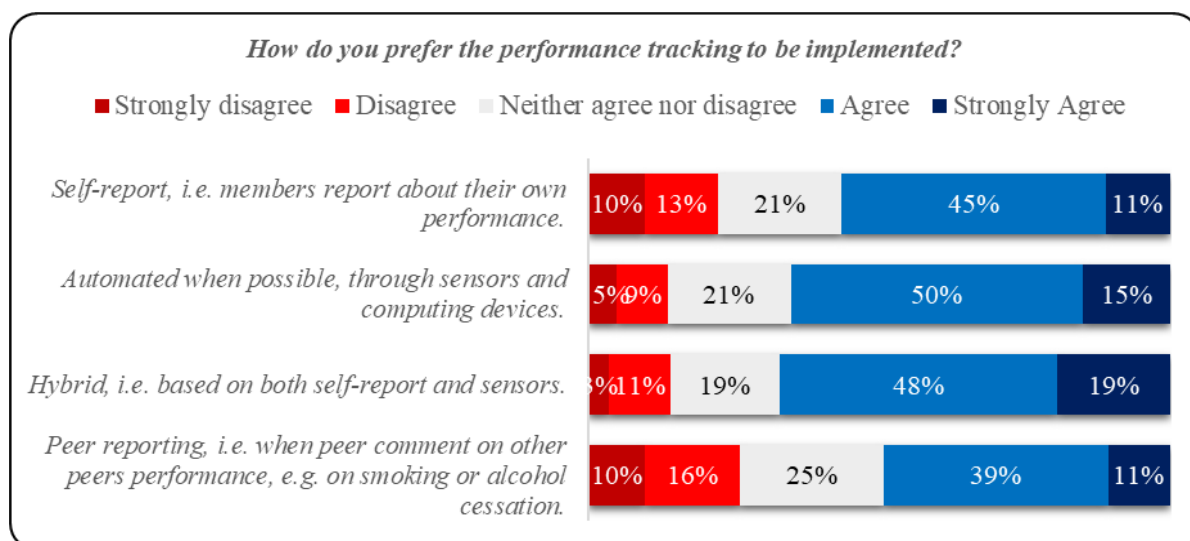


FIGURE 56: HOW DO YOU PREFER THE PERFORMANCE TRACKING TO BE IMPLEMENTED?

In terms of the membership criteria, the survey questions the participant's opinion about the role they would like to take in the online peer group. Figure 57 indicates the question and respondents' opinion about the role prefer to take in the group. The majority of respondents 79% like to take group member role when joining a peer support group mean score is 3.91; to participate in group activities. Also, 41% stated that they like to take both roles: group member and group moderator, the mean score is 3.10. The smallest proportion 37% like to take group moderator role, the mean score is 2.97.

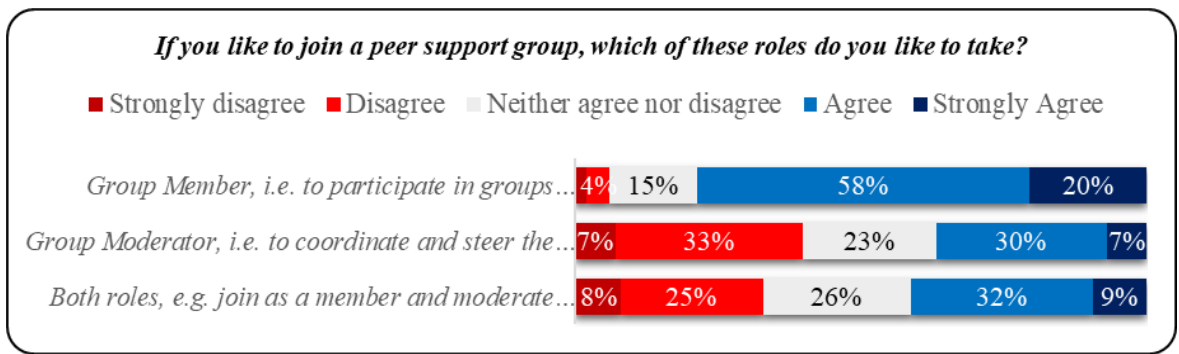


FIGURE 57: PREFERRED ROLES IN PEER SUPPORT GROUP

In terms of membership criteria, Figure 58 shows the question and the participants' responses of the new member. Majority of respondents 79% stated that a new member should have similar wellbeing issue to other members; the mean score is 3.94. Also, a large proportion 60% stated that a new member should have a similar level of severity of the wellbeing issue and similarity in personality and profile, e.g. hobbies, values, and communication style. The mean score is 3.59 and 3.02, respectively.

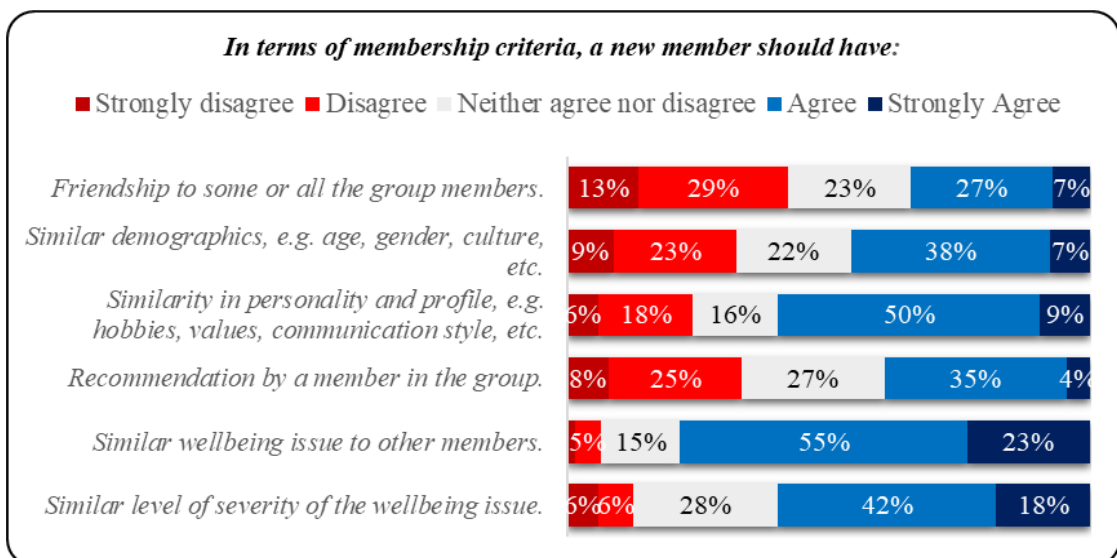


FIGURE 58: MEMBERSHIP CRITERIA

In relation to the exit procedure to leave the group, the survey question indicates in Figure 59, which displays the graphically represented and the questions about the personal reason to leave the group. Sixty-two per cent of respondents indicated that, concerning leaving the group by individual members, members should declare in advance if they want to exit the group, so others become prepared; the mean score is 3.46. Fifty-five per cent indicated that members who violate the group norms and mission should be forced to exit the group; the mean score is 3.54. Finally, 50% indicated that members who decide to leave the group spontaneously should give other members a reason; the mean score is 3.22.

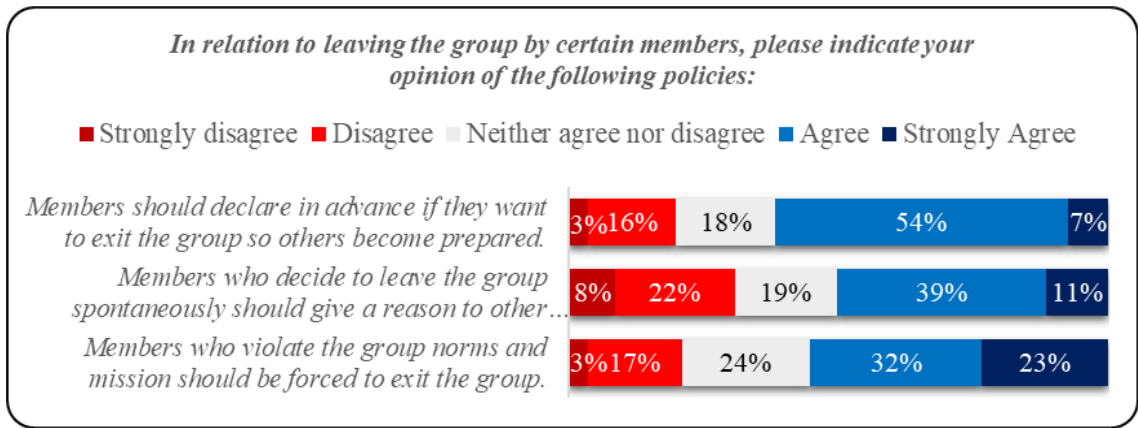


FIGURE 59: POLICIES OF LEAVING THE GROUP

In relation to who decide if a member can leave the group, the question is: *when achieving all his/her targets, who should decide if a member, can leave the group?*

The survey asked the questions shown in Figure 60, showing the participants' responses. The majority of respondents 70% decided that members should decide if a member can leave the group when achieving all his/her targets; the mean score is 3.73. Others, 56% stated that the moderator should decide that the mean score is 3.36. Less than half of the sample, 47% stated that the software based on performance data should decide; the mean score is 3.15.

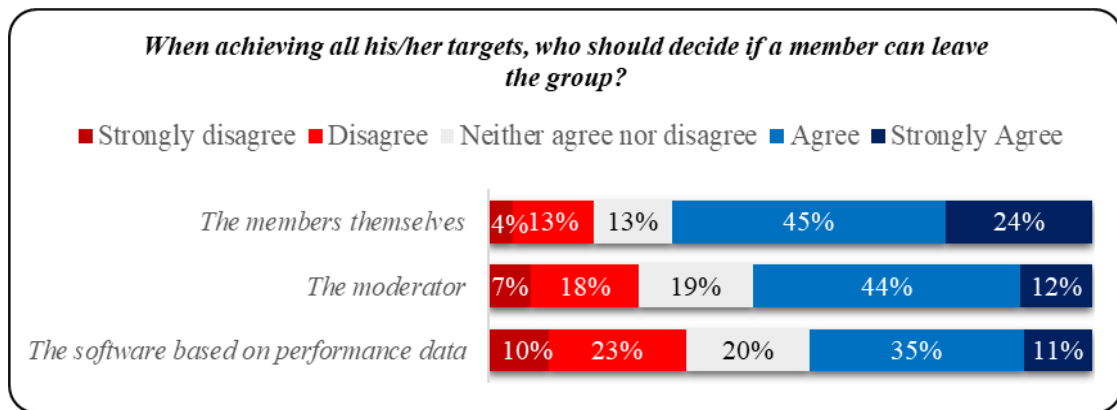


FIGURE 60: DECISION OF LEAVING THE GROUP

Regarding who can decide to delete group member who violates group rules from the group, the survey asked *who can decide if the member should exit the group when he/she violates the group rules and mission?*

The graphical representation in Figure 61 displays the questions and the participant's responses. In terms of violation of the group rules and mission, 81% of respondents stated that the moderator could decide if the member should exit the group when he/she violates the group rules and mission, mean score is 3.95. Also, 62% stated that group vote (based on a recommendation by the moderator) could decide if the member should exit the group when he/she violates the group rules

and mission, mean score is 3.57. Little more than half of the sample, 55% and 51% stated that group vote (based on a recommendation by some members) and the software (based on data and reports about performance and group interaction) could decide if the member should exit the group when he/she violates the group rules and mission; the mean score is 3.39 and 3.31, respectively.

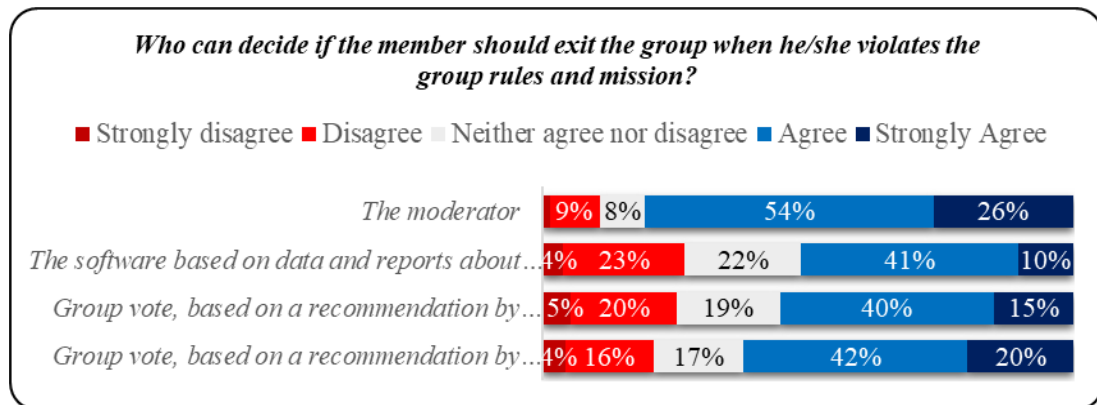


FIGURE 61: WHO CAN DECIDE IF THE MEMBER SHOULD EXIT THE GROUP WHEN HE/SHE VIOLATES THE GROUP RULES AND MISSION?

Regarding the privacy and restrict visibility from other group members, Figure 62 shows the privacy questions and the percentage of the participants' responses. A large proportion of respondents, 65% stated that they like to restrict the visibility of the feedback they receive (e.g. from moderator, software, peers) from other group members, mean score is 3.66. Also, more than half of the sample 55% agreed that they like to restrict the visibility of their performance data (e.g., progress and rewards) from other members in the group, mean score is 3.45. Finally, 53% agreed that they like to restrict their profile data's visibility from other group members; the mean score is 3.37. Only 20% agreed that none of the above should be restricted.

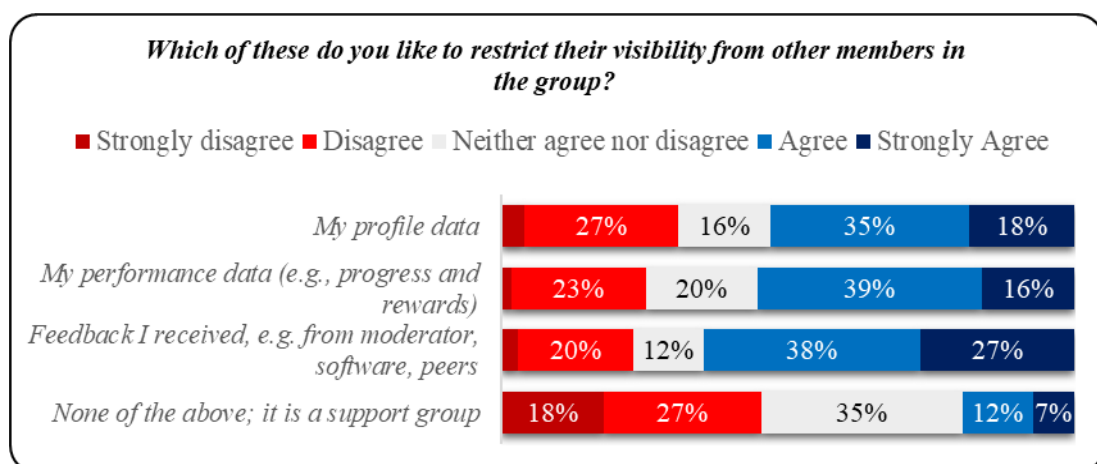


FIGURE 62: WHICH OF THESE DO YOU LIKE TO RESTRICT THEIR VISIBILITY FROM OTHER MEMBERS IN THE GROUP?

7.2.3 GROUP MODERATOR SURVEY QUESTIONS

The qualitative outcome indicated six themes required the group should have in the group moderator's design, which is reinforcement function, authority, domain experience, skills; allocate strategy, moderator nature and tasks. The requirement features explored from the qualitative study were many, so the survey designed to cover the variabilities requirements of online peer group design. The survey has 29 questions around the group moderator themes. The Likert scale questions are centred on "important" or "not important" with five rating scale. The question about the nature of the moderator on the online peer group is: *In terms of the nature of the moderator; I want the moderator to be?*

Regarding the nature of the moderator, Figure 63 shows the participants' preference for the nature of the moderator. The majority of respondents, 84% want the moderator to human, and the mean score is 4.17. Others, 68% want the moderator to be blended (human and software together), the mean score is 3.73. Only 28% want the moderator to be software (e.g. automatic target calculation and providing advice), mean score is 2.72.

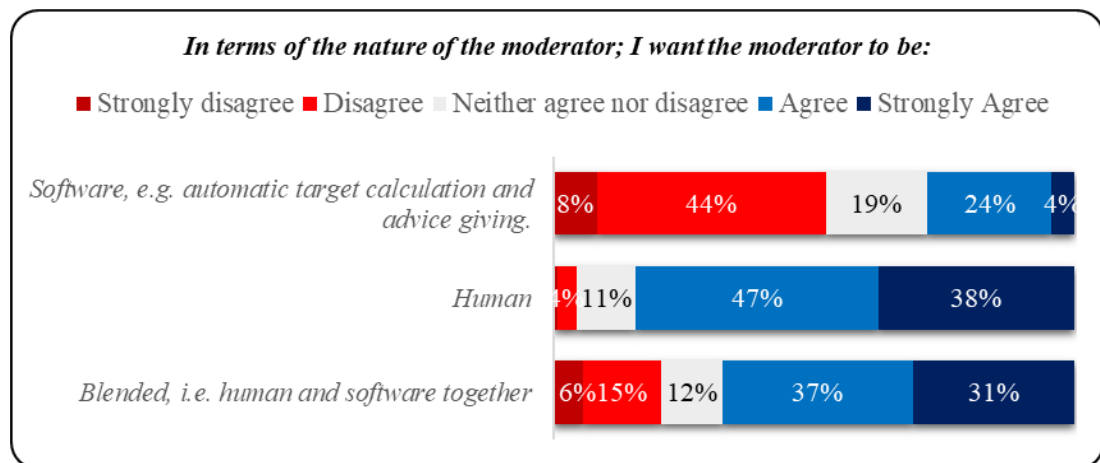


FIGURE 63: THE NATURE OF THE MODERATOR

In terms of allocating a human moderator, Figure 64 shows the strategy of allocating moderator and the participants' opinion. The majority of respondents 90% believe that the allocation of a human moderator should be based on experience (e.g. in group management, counselling and earlier success), the mean score is 4.23. The second strategy preferred by 79% of respondents for allocating a human moderator is performance (e.g. being an aid to others and improving personal

wellbeing score), the mean score is 3.97. The third strategy is voting by members, preferred by 63% of respondents, and the mean score is 3.57.

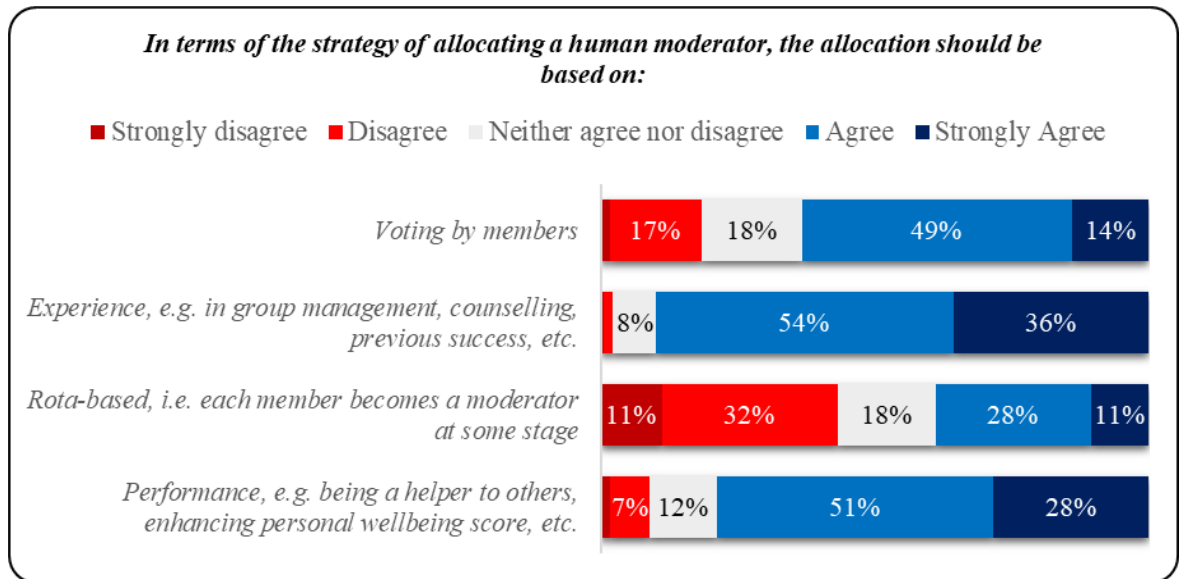


FIGURE 64: THE STRATEGY OF ALLOCATING A HUMAN MODERATOR

In relation to the moderator skills, Figure 65 shows moderator skills' preference. The majority of respondents, 92% stated that the moderator should have strong communication skills (verbal and non-verbal, diplomacy, and motivating language); the mean score is 4.46. Also, 89% stated that the moderator should have knowledge in (e.g. behavioural change, management and leadership skills), the mean score is 4.35.

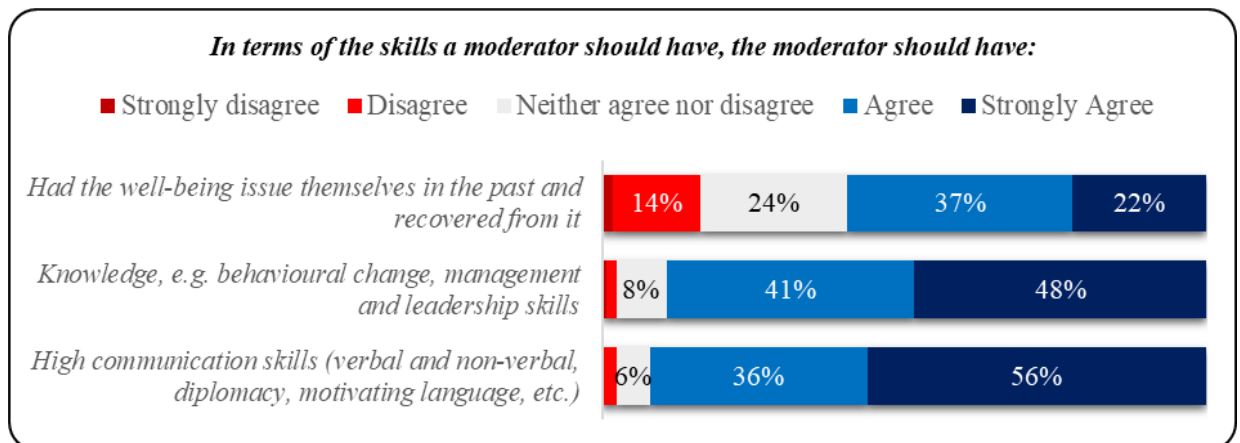


FIGURE 65: THE SKILLS A MODERATOR SHOULD HAVE

In terms of the moderator's responsibility and permission to monitor group members, Figure 66 shows the participants' responses. The majority of respondents, 83% believe that the moderator should be able to access members performance data (e.g., attainment of targets and goal progress). Also, 75% believe that the moderator should be able to access data about members communication styles (e.g., reports showing members to be helpful, distractor and digression); mean score is 3.99 and 3.83, respectively.

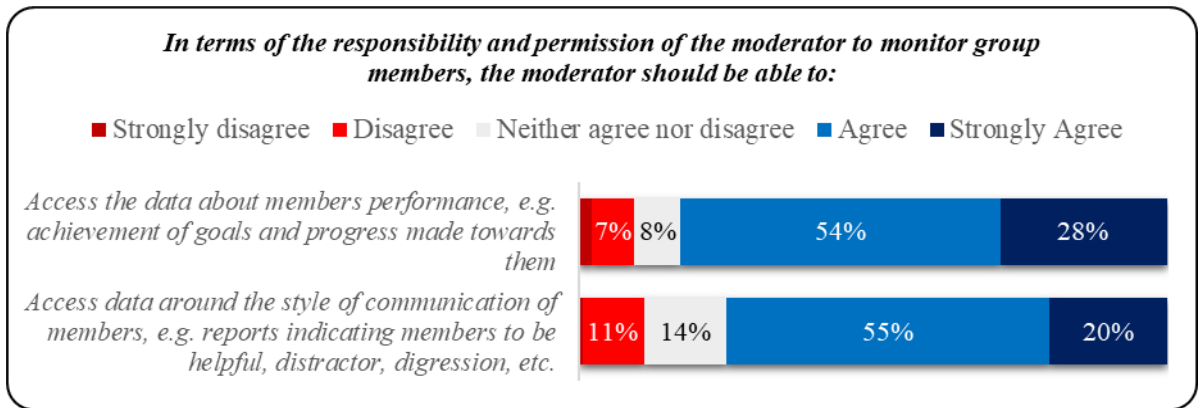


FIGURE 66: RESPONSIBILITY AND PERMISSION OF THE MODERATOR TO MONITOR GROUP MEMBERS

In terms of the moderator authority, Figure 67 displays the percentage moderator authority questions and the participant's response. The majority 82% stated that the moderator should be able to manage the membership (e.g., adding new members and excluding those who break the rules), the mean score is 3.96. Also, 68% stated that the moderator should be able to exclude members from some activities (e.g., banning video games and certain food at night hours.), and 66% stated that the moderator should be able to set up the online environment (e.g. the colours, the forum subjects, the sounds and the reminders); mean score is 3.55 and 3.65, respectively.

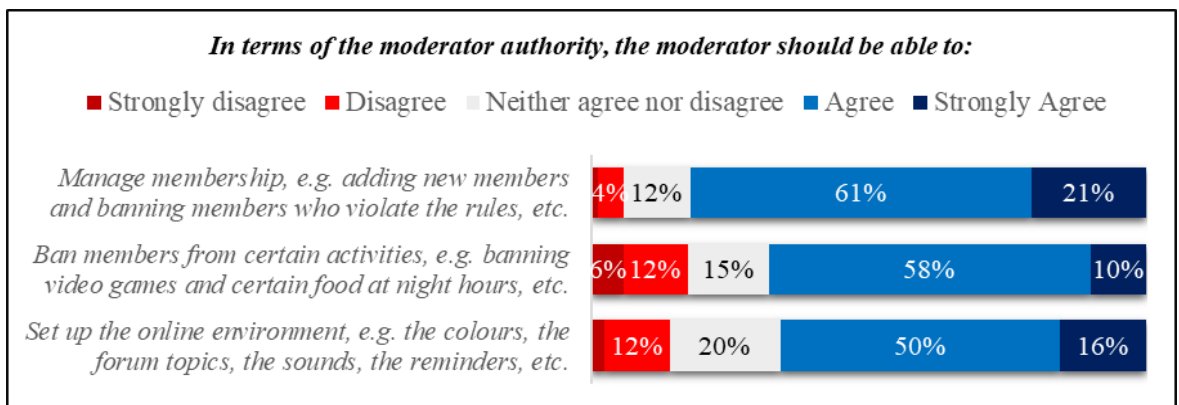


FIGURE 67: THE MODERATOR AUTHORITY

In terms of the moderator's responsibility and permission to issue rewards and penalty to members, Figure 68 shows the questions and the percentage of the responses. The majority of respondents, 87% stated that the moderator should be able to issue rewards to members centred on the enhancement of their performance; the mean score is 4.11. Also, 83% stated that the moderator should be able to issue rewards centred on the members interactions within the online group (e.g. assisting others); the mean score is 4.02.

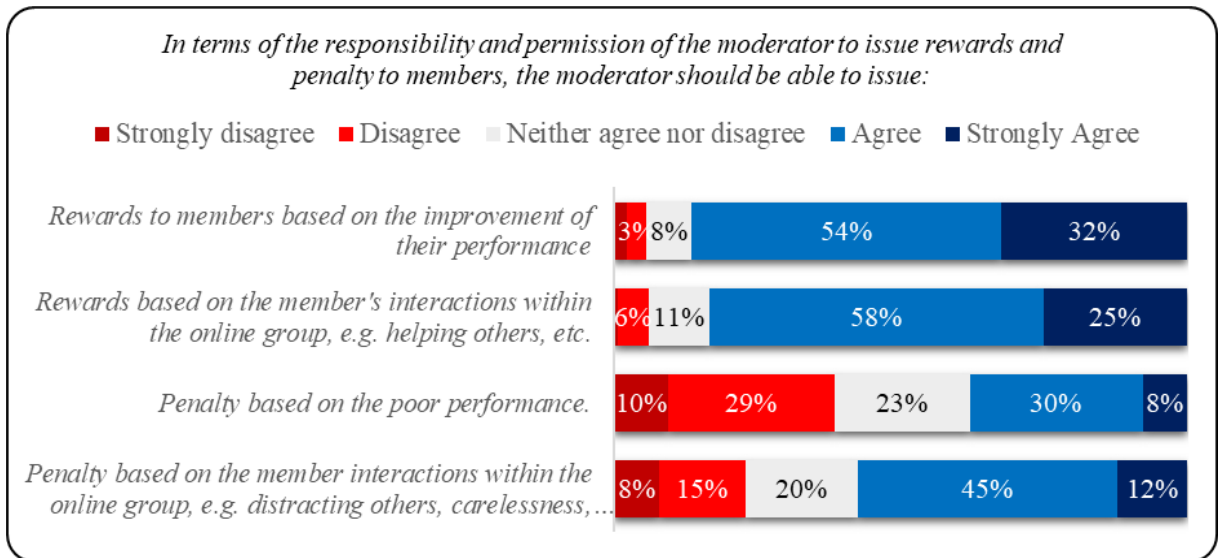


FIGURE 68: THE RESPONSIBILITY AND PERMISSION OF THE MODERATOR TO ISSUE REWARDS AND PENALTY TO MEMBERS

In terms of the moderator's responsibility and permission to manage performance goals, the responsibilities listed in Figure 69 are stated by most respondents, with percentages ranging from 77% to 93%, and a mean score ranging from 3.83 to 4.34. On top of responsibilities, 93% of respondents stated that the moderator should be able to discuss obstacles to goals attainment with members, such as resolving conflicting goals. Next, 91% stated that give personalised best practices and recommendations about how to attain goals to members, 89% agreed that the moderator should be able to discuss goal achievement with members frequently, 79% agreed that the moderator should be able to specify performance goals for members, and 77% agreed that the moderator should be able to change goals for members, e.g., grant the extension.

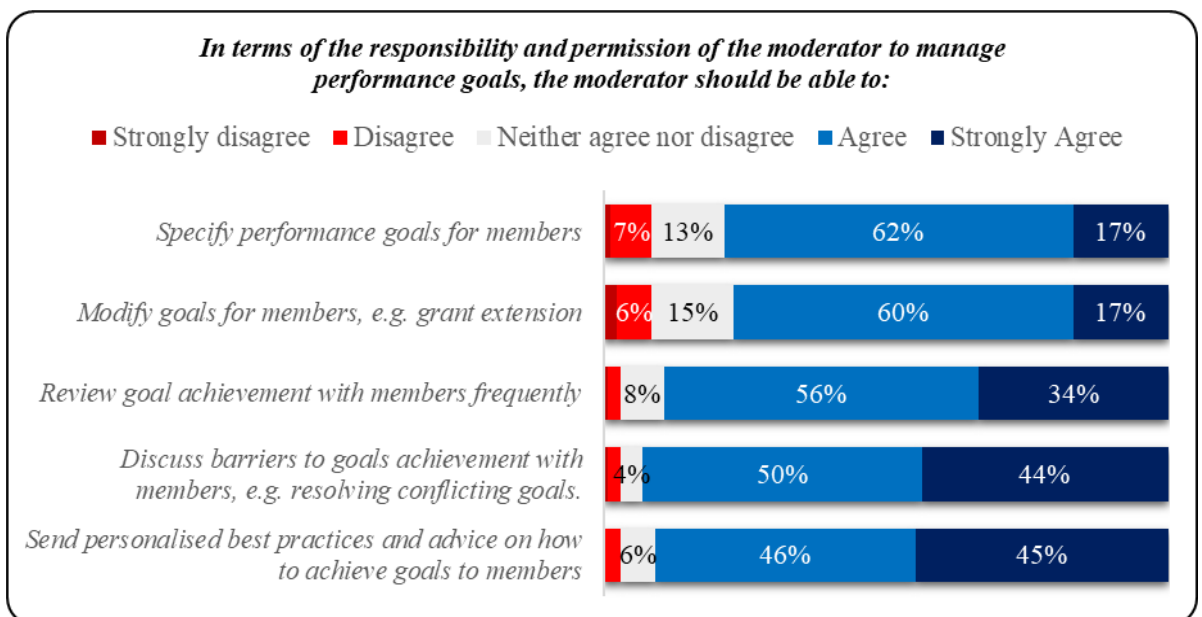


FIGURE 69: THE RESPONSIBILITY AND PERMISSION OF THE MODERATOR TO MANAGE PERFORMANCE GOALS

Concerning moderator task Figure 70 shows the moderator feedback questions and participants responses. In terms of the moderator's responsibility and permission to provide feedback to

members, 92% of respondents agreed that the moderator should be allowed to send feedback about self-progress to members (such as their self-improvement), with a mean score of 4.28. Also, 79% agreed that the moderator should be able to provide feedback to members about their interaction (e.g. being seen as a helper or distractor), with a mean score of 3.96. Similarly, 79% agreed that the moderator should be able to provide feedback about how the group performs as a whole (i.e. collectively), with a mean score of 3.88. Next, 62% agreed that the moderator should be able to select the framing and the tone of the feedback (e.g. advice, assertive, strict and friendly), with a mean score of 3.56.

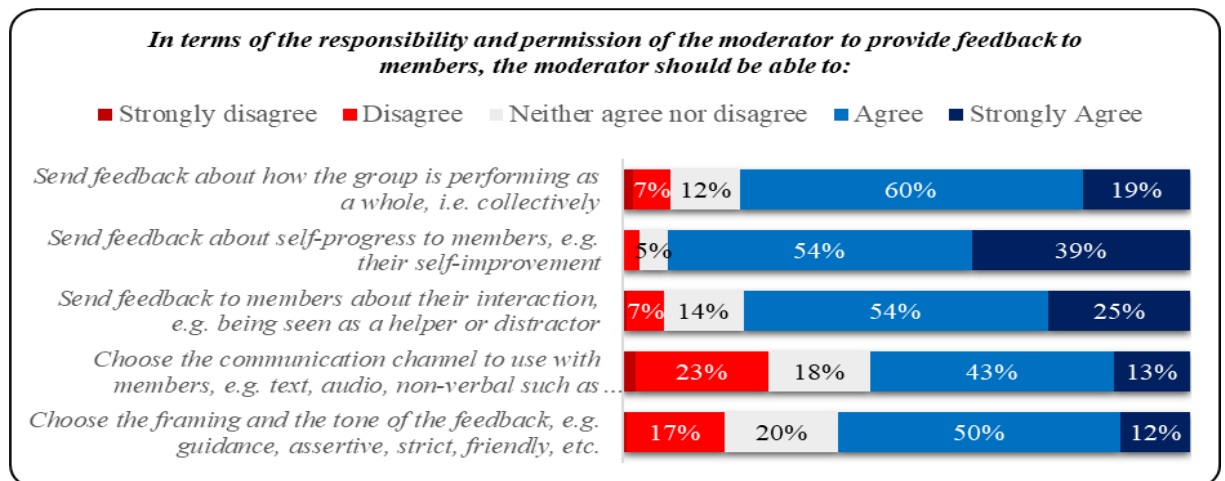


FIGURE 70: THE RESPONSIBILITY AND PERMISSION OF THE MODERATOR TO PROVIDE FEEDBACK TO MEMBERS

7.3 INFRENTIAL ANALYSIS – RELATIONSHIPS

In this section, results of linear regression analysis are presented and interpreted. A series of multiple linear regressions using the enter method were conducted. In each model the predictors were gender (male/ female); region (UK/ the Middle East); perceived usefulness of peer support groups; willingness to join a peer support group; the five personality trait scores of extraversion, agreeableness, conscientiousness, neuroticism and openness; and self-control score. For each model, the outcome measure was the individual questions used to measure attitudes relating to the moderator role, moderator tasks, functional governance and non-functional governance, as identified within each model's description in the section below.

7.3.1 GOVERNANCE FUNCTIONAL REGRESSION ANALYSIS

The quantitative research explored the variability preference of design online peer group, and the finding showed various preferences of the governance function design. The survey questions are designed based on the quantitative finding. Table 19 includes the phrasing in survey questions used to reflect the qualitative findings and the elaborated descriptions of G1 to G4. A series of linear regressions using the enter method was conducted. For each model, the outcome measure was the individual questions used to measure attitudes relating to the various preferences of online peer groups design, as identified within the description of each model result in the section below.

The enter approach was used to perform a sequence of linear regressions. The individual questions used to measure attitudes relating to the various preferences of design online peer groups, as identified in the overview of each model result in the section below, were the outcome measure for each model.

TABLE 19: GOVERNANCE FUNCTIONAL AS SEEN BY MEMBERS: A TABLE VIEW

Governance function Theme	Sub-themes
[G1] Members comparisons	[G1.1] Performance reports, e.g. charts and data on how I am progressing [G1.2] How the group as a whole is performing, e.g. 90% of members have been successful in meeting goals at Level 1 [G1.3] Specific members performance, e.g. performance of members with similar profile and stage of the issue
[G2] Performance reinforcement function	[G2.1] Socially recognising good performance, e.g. badges based on self-progress [G2.2] Recognising top performers, e.g. leader boards for weekly performance [G2.3] Adjusting the score and level of members based on performance and interaction [G2.4] Showing comparison with other members performance [G2.5] Banning members, temporarily or completely, e.g. when violating the group norms and disturbing others
[G3.1] Performance feedback source	[G3.1.1] Peer members [G3.1.2] Group moderator [G3.1.3] Software, e.g. charts based on my data
[G3.2] Subject of the feedback	[G3.2.1] How I am achieving short term goals [G3.2.2] How I am achieving long term goals [G3.2.3] How others are performing with their goals [G3.2.4] How my current status compares with my status when I joined the group [G3.2.5] How others current status compares with their status when they joined the group
[G3.3] Communicating the feedback	[G3.3.1] One-to-one chat with moderator [G3.3.2] Text-based communication [G3.3.3] Audio-based communication [G3.3.4] Non-verbal cues, e.g. emoji and change in the colour scheme [G3.3.5] Text reports detailing my performance [G3.3.6] Automated software, i.e. automatically generated and communicated [G3.3.7] Querying the software about performance and feedback when I like to do so [G3.3.8] Frequent messages, e.g. hourly or several times a day
[G3.4] Tone of the feedback	[G3.4.1] Focuses on my positive side [G3.4.2] Mentions both positive and negative points about me [G3.4.3] Has an encouraging tone [G3.4.1] Factual and neutral, i.e. facts and numbers, with no tone in it.
[G4] Setting performance goals	[G4.1] To set up goals by myself [G4.2] The moderator involvement in setting goals for me [G4.3] Collective goals, e.g. a goal to achieve together with other members.

	[G4.4] Short-term goals, e.g. daily or weekly goals [G4.5] Long-term goals, e.g. monthly goals
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7.3.1.1 COMPARISONS AND BENCHMARKING

In terms of governance comparisons models [G1], we showed that one model was significant. The finding found that [G1.1] *Performance reports, e.g. charts and data on how I am progressing, were significant for comparison in the online peer group. Performance report significantly predicted 12.6 % of the variance (R2= .126, F (10, 178)=2.56, p=.006), with the significant predictors extroversion ($\beta = -.117, p<.05$). As such as extroversion increase if the important of the feature increase. The outcome of [G1.2] *How the group as a whole is performing, e.g. 90% of members have been successful in meeting goals at Level model (R2=0.212, F (10, 178) =4.78, p=.001), accounted for 21.2% of the variance. Out of these, perceived usefulness of peer support was the only significant predictor ($\beta = .382, p<.05$), suggesting that as perceived usefulness increases; this feature's importance also decreases. The other models related to [G1.3] *specific members performance, e.g. performance of members with similar profile and stage of the issue were not significant.***

7.3.1.2 REINFORCEMENT FUNCTION

In term of [G2] the governance reinforcement function in the online peer group, the analysis showed that one model within the section was significant. The model for [G2.2] *Recognising top performers, e.g. leader boards for weekly performance (R2= .137, F (10, 178) = 2.82, p=.003) accounted for 13.7% of the variance in the outcome. There were three significant predictors, extraversion ($\beta = -.107, p<.05$), agreeableness ($\beta = -.129, p<.05$) and conscientiousness ($\beta = .126, p<.05$). This suggests that as extraversion and agreeableness increase, and as conscientiousness decreases, there is an increase in this feature's importance. The other models remaining strategies within this section were non-significant. These were [G2.1] *Socially recognising good performance, e.g. badges based on self-progress, [G2.3] Adjusting the score and level of members based on performance and interaction, [G2.4] showing comparison with other members performance and [G2.5] Banning members, temporarily or completely, e.g. when disrespectful the group norms and disturbing others.**

7.3.1.3 FEEDBACK

Concerning governance feedback [G3] in the online peer group, the qualitative analysis revealed four sub-themes: feedback source, subject, communication, and framing.

1. Feedback source: In term of the [G3.1.1] feedback source we established that none of the models were significant for the three outcome measures concerning to this topic were significant, which were [G3.1.1] *Peer members; [G3.1.2] Group moderator and [G3.1.3] Software, e.g. charts based on my stored data.*

2. Feedback subject: In terms of [G3.2] subject of the feedback we found that none of the models in this group was statistically significant, [G3.2.1] *How I am achieving short term goals*; [G3.2.2] *How I am achieving long term goals*; [G3.2.3] *How others are performing with their goals*; [G3.2.4] *How my current status compares with my status when I joined the group*; [G3.2.5] *How others current status compares with their status when they joined the group*.
3. Feedback communicating: The feature for [G3.3] communication feedback has nine models; the regression analysis indicates there is three of the models tested in this section were significant. The finding showed that [G3.3.1] *One-to-one chat with moderator*: This model was significant ($R^2 = .127$, $F(10,178) = 2.59$, $p=.006$), accounting for 12.7% of the variance in the outcome. There was one significant predictor, which was neuroticism ($\beta = .109$, $p <.05$). This suggests that neuroticism increases agreement of this feature increase. The model for [G3.3.4] *Non-verbal cues, e.g. emoji and changes in the colour scheme*: This model was significant ($R^2 = .130$, $F(10,178) = 2.66$, $p=.005$), accounting for 13% of the variance in the outcome. There were three significant predictors, which were willingness to join an online peer support group ($\beta = -.27$), conscientiousness ($\beta = -.160$, $p<.05$) and self-control ($\beta = .029$, $p<.05$). This suggests that as both willingness and conscientiousness increase, there is a decrease in this feature's agreement; however, self-control increases agreement of this feature increase.

The finding showed that [G3.3.7] *querying the software about performance and feedback when I like to do so*: This model was significant ($R^2 = .118$, $F(10,178) = 2.38$, $p = .011$), accounting for 11.8% of the variance in the outcome. There were two significant predictors, which were gender ($\beta = -.326$, $p<.05$) and extraversion ($\beta = .091$, $p<.05$). This suggests that females place the greater agreement on this feature and that as extraversion increases, this feature's agreement increases. None of the remaining models in this group was statistically significant, specifically Forum and group chat; [G3.3.2] *Text-based communication*; [G3.3.3] *Audio-based communication*; [G3.3.5] *Text reports detailing my performance*; [G3.3.8] *Frequent messages, e.g. hourly or several times a day; Automated software, i.e. automatically generated and communicated*.

7.3.1.4 FRAMING AND TONE OF THE FEEDBACK

In terms of the [G3.4] *Tone of the feedback in the peer group, the analysis showed that one of the section's models was significant*. The model for [G3.4.2] *Mentions both positive and negative sides* was significant ($R^2 = .103$, $F(103,178) = 2.03$, $p=.032$), accounting for 10.3% of the variance in the outcome. There was one significant predictor, which was extraversion ($\beta = .115$, $p<.05$). This suggests that as extraversion increases the agreement of this feature increases. None of the remaining models in this group was statistically significant, specifically [G3.4.1] *Focuses*

on my positive side; [G3.4.3] *Has an encouraging tone*; [G3.4.4] *Factual and neutral, i.e. facts and numbers, with no tone in it.*

7.3.2 PERFORMANCE GOALS

The strategy for of [G4] setting performance goals has four model and the regression analysis indicates that one of the models tested within in this section was significant. The finding showed that [G4.4] *Short-term goals, e.g. daily or weekly goals* model was significant ($R^2 = .109$, $F(10,178) = 2.19$, $p = .021$), accounting for 10.9% of the variance in the outcome. There were two significant predictors, perceived usefulness of online peer support groups ($\beta = .201$, $p < .05$) and perceived willingness to participate in an online peer support group ($\beta = -.249$, $p < .05$). This proposes that as perceived usefulness increases there is increase in the agreement of this strategy, however conversely willingness to participate online peer support groups decrease as an agreement with this strategy increase. The models for the remaining three strategies in this section were non-significant. These were [G4.1] *To set up goals by myself*; [G4.2] *The moderator involvement in setting goals for me*; [G4.3] *Collective goals, e.g. reducing total online gaming for the group by 20% this week* and [G4.5] *Long-term goals, e.g. monthly and seasonal goals.*

7.3.3 GOVERNANCE NON-FUNCTIONAL

The quantitative research explored the variability preference of designing online peer group. The findings showed there are various preferences for designing the non-governance functional. The survey questions were designed based on the quantitative finding. Table 20 includes the wording used in survey questions to reflect the qualitative findings, the elaborated descriptions of themes B1 to B4. The enter method was used to perform a sequence of linear regressions. For each model, the outcome measure was the individual questions used to measure attitudes relating to the different preferences of the design of online peer groups, as identified in the explanation of each model result in the section below, were the outcome measure for each model.

TABLE 20: NON-GOVERNANCE FUNCTIONAL AS SEEN BY MEMBERS: A TABLE VIEW

Non-Governance functional Theme	Sub-themes
[B1.1] Who make design to the leave the group	[B1.1.1] Members should declare in advance if they want to exit the group so others become prepared [B1.1.2] Members who decide to leave the group spontaneously should give a reason to other members [B1.1.3] Members who violate the group norms and mission should be forced to exit the group
[B1.2] Who should decide if a member can leave the group when achieving target	[B1.2.1] The members themselves [B1.2.2] The moderator [B2.2.3] The software based on performance data
[B1.3] Who decide if the member should exit the	[B1.3.1] The moderator

group when he/she violates the group rules	[B1.3.2] The software based on data and reports about performance and group interaction [B1.3.3] Group vote, based on a recommendation by some members [B1.3.4] Group vote, based on a recommendation by the moderator
[B2] Membership criteria	[B2.1] Friendship to some or all the group members [B2.2] Similar demographics, e.g. age, gender, culture, etc. [B2.3] Similarity in personality profile, e.g. hobbies, values, communication style, etc [B2.4] Recommendation by a member in the group [B2.5] Similar wellbeing issue to other members [B2.6] Similar level of severity of the wellbeing issue
[B3] Privacy	[B3.1] My profile data [B3.2] My performance data (e.g., progress and rewards) [B3.3] Feedback I received, e.g. from moderator, software, peers [B3.4] I like to be open about all the above and to all, It is a support group
[B4] performance tracking	[B4.1] Self-report, i.e. members report about their own performance [B4.2] Automated when possible, through sensors and computing devices. [B4.3] Hybrid, i.e. based on both self-report and sensors [B5.4] Peer surveillance, i.e. when peer report others behaviour, e.g. on smoking or alcohol cessation

7.3.3.1 EXIT PROCEDURE

In terms of exit procedure strategy, the qualitative analysis showed two sub-themes: the reason to exit from the group and [B1.1] who make the decision to leave the group. In relation to the reason for the exit, there are two models. The first model is about the strategy of leaving the group and the results showed that none of the models were significant for the three outcome measures relevant to this topic, which were [B1.1.1] *Members should declare in advance if they want to exit the group, so others become prepared*; [B1.1.2] *Members who decide to leave the group spontaneously should give a reason to other members* and [B1.1.3] *Members who violate the group norms and mission should be forced to exit the group*.

The second model about [B1.2] Who should decide if a member can leave the group when achieving all his/her target. The regression analysis indicates that one of the models tested in this section was significant. The finding showed that [B1.2.2] *The moderator* significantly predicted 9.8% of the variance ($R^2 = .098$, $F = (10,178=1.941, p=.043)$), with the significant predictors being perceived usefulness of online peer support groups ($\beta = -.196, p<.05$), extraversion ($\beta = -.119, p<.05$), openness ($\beta = .162, p<.05$). As such, openness increased if the agreement with the moderator's strategy increased; however, as both extraversion and perceived usefulness of online peer support groups decreased as an agreement with this strategy increased. The models for the

two remaining strategies in this section were non-significant. These were [B1.2.1] *The members themselves* and [B1.2.3] *The software based on performance data*.

In relation to [B1.3] Who can decide if the member has to leave the group when he/she violates the group rules and mission models, the analysis found that two of the section's models were significant. The model for [B1.3.1] *The moderator* ($R^2=.108$, $F= (10,178) = 2.164$, $p=.022$) accounted for 10% of the variance was significantly predicted by the three predictors of culture ($\beta = .355$, $p<.05$), extraversion ($\beta = -.083$, $p<.05$) and self-control ($\beta = -.023$, $p<.05$). As a result, as both extraversion and self-control decreased, acceptance of this technique increased. There was more acceptance of this strategy in the Middle East than in the UK. The outcome of [B1.3.3] *Group vote, based on a recommendation by some members model* ($R^2=.098$, $F= (10,178)=1.935$, $P=.043$) accounted for 9.8% of the variance. It was considerably projected by being perceived usefulness of online peer support groups ($\beta = -.305$, $P<.05$). As such acceptance of this strategy increased as perceived usefulness of online peer support groups decreased. The other two models related to [B1.3.2] *The software based on data and reports about performance and group interaction*; and [B1.3.4] *Group vote, based on a recommendation by the moderator*; were not significant.

7.3.3.2 MEMBERSHIP CRITERIA

The strategy for [B2] membership criteria has six models, and the regression analysis shows that one of the models tested in this section was significant. The finding indicated that [B2.5] *Similar wellbeing issue to other members model* significantly predicted 11.4% of the variance ($R^2=.114$, $F= (10, 178)=2.29$, $P=.015$), with the significant openness ($\beta = .123$, $P<.05$) and self-control ($\beta = -.031$, $P<.05$). As a result, important of the strategy increased as the openness increased; nevertheless, self-control decreased as important with this strategy increased. The models for the five remaining strategies in this section were non-significant. These were [B2.1] *Friendship to some or all the group members*; [B2.2] *Similar demographics, e.g. age, gender, culture, etc.*; [B2.3] *Similarity in personality and profile, e.g. hobbies, values, communication style, etc.*; [B2.4] *Recommendation by a member in the group*; and [B2.6] *Similar level of severity of the wellbeing issue*.

7.3.3.3 PRIVACY

In terms of [B3], the online peer group's privacy strategy has four models, and the regression analysis shows that one of the models tested in this section was significant. The analysis outcome showed that [B3.1] *My profile data model* ($R^2= .112$, $F= (10, 160) =2.01$, $P=.035$) accounted for 11.2% of the variance was significantly predicted by the three predictors of being perceived usefulness of online peer support groups ($\beta = -.305$, $P<.05$), agreeableness ($\beta = .149$, $P<.05$) and neuroticism ($\beta = -.106$, $P<.05$). As such, agreeableness increased as acceptance of the strategy increased; however, as both neuroticism and perceived usefulness of online peer support groups

decreased, acceptance of this strategy increased. The remaining three strategies in this section had non-significant models. These were [B3.2] *My performance data (e.g., progress and rewards)*; [B3.3] *Feedback I received, e.g. from the moderator, software, peers*; and [B3.4] *I like to be open about all the above, and to all, It is a support group*.

7.3.3.4 TRACKING SYSTEM

In term of the [B4] performance tracking system models, for the three outcome measures related to this topic, none of the models were significant. which were [B4.1] *Self-report, i.e. members report about their performance*; [B4.2] *Automated when possible, through sensors and computing devices*; [B4.3] *Hybrid, i.e. based on both self-report and sensors*; and [B4.4] *Peer reporting, i.e. when peer comment on other peers performance, e.g. on smoking or alcohol cessation*.

7.3.4 MODERATOR

The qualitative phase analysis revealed six main themes: moderator authority, reinforcement function, moderator skills, moderator allocate strategy and moderator tasks. The survey question designed based on the quantitative finding, Table 21 and Table 22, includes the wording in survey questions used to reflect the qualitative results and the elaborated descriptions of themes A1 to A6.

TABLE 21: MODERATOR PROFILE AND ROLE AS SEEN BY MEMBERS: A TABLE VIEW

Theme	Sub-theme
[A1] Moderator nature	[A1.1] Software, e.g. automatic target calculation and advice-giving [A1.2] Human [A1.3] Blended, i.e. human and software together
[A2] Moderator allocation strategy	[A2.1] Voting by members [A2.2] Experience-based, e.g. experience in group management, counselling, previous success, etc. [A2.3] Rota-based, i.e. each member becomes a moderator for sometime [A2.4] Performance, e.g. those who prove to be a helper to others, enhancing personal wellbeing score, etc.
[A3] Moderator skills	[A3.1] Had the well-being issue in the past and recovered from it [A3.2] High communication skills [A3.3] Management and leadership skills
[A4] Moderator authority	[A4.1] To manage membership, e.g. adding new members and banning members who violate the rules [A4.2] To ban members from doing certain activities, e.g. banning video games and social media at night hours [A4.3] To set up the online environment, e.g. the colours, the forum topics, the sounds, the reminders
[A5] Moderator reinforcement role	[A5.1] Reward members based on the improvement of their performance [A5.2] Issue penalty based on the poor performance [A5.3] Reward members based on interactions, e.g. help others and adherence to chat rules

	[A5.4] Issue penalty based on interactions within the online group
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TABLE 22: MODERATOR TASKS AS SEEN BY MEMBERS: A TABLE VIEW

Theme	[A6] Moderator tasks
[A6.x] Sub-theme	[A6.x.y] Sub-Sub-theme
[A6.1] Monitor group members	[A6.1.1] Access the data about members' performance, e.g. achievement of goals and progress made towards them. [A6.1.2] Access data around the style of communication of members, e.g. reports indicating members to be helpful, distractor, digression, etc.
[A6.2] Manage performance goals	[A6.2.1] Specify performance goals for members [A6.2.2] Modify goals for members, e.g. grant an extension [A6.2.3] Review goal achievement with members frequently [A6.2.4] Discuss barriers to goals achievement with members, e.g. resolving conflicting goals. [A6.2.5] Send personalised best practices and advice on how to achieve goals to members
[A6.3] Provide feedback	[A6.3.1] Send feedback about how the group is performing as a whole, i.e. collectively [A6.3.2] Send feedback about self-progress to members, e.g. their self-improvement [A6.3.3] Send feedback to members about their interaction, e.g. being seen as a helper or distractor [A6.3.4] Choose the communication channel to use with members, e.g. text, audio, non-verbal such as emoji, chat, etc. [A6.3.5] Choose the framing and the tone of the feedback, e.g. guidance, assertive, strict, friendly, etc.

7.3.4.1 NATURE OF THE MODERATOR STOP HERE

In terms of [A1] nature of the moderator models, we discovered that none of the models was significant for the three outcome measures related to the topic, which were [A1.1] *Software*, e.g. *automatic target calculation and advice-giving*; [A1.2] *Human*; or [A1.3] *Blended*, which includes human and software together.

7.3.4.2 THE STRATEGY FOR ALLOCATING HUMAN MODERATORS

There are four models in the [A2] group moderator allocation strategy; regression analysis revealed that one of the models analysed in this section was significant. The results revealed that [A2.1] *voting by group members* is a significant model for determining who will be the group moderator. Voting by members significantly projected 12.0% of the variance ($R^2 = .120$, $F(10,160) = 2.18$, $p = .021$), with perceived usefulness of online peer support groups ($\beta = -.210$, $p < .05$), willingness to join online peer support groups ($\beta = .247$, $p < .01$), openness ($\beta = -.093$, $p < .05$) and self-control ($\beta = -.033$, $p < .05$) being the significant predictors. As a result, the perceived effectiveness of online peer support groups increased as member agreement with the voting strategy increased; however, as member agreement with the voting strategy increased, desire to

join online peer support groups decreased. Acceptance of the technique decreases as both transparency and self-control increase. As both openness and self-control increase acceptance of the strategy decreases. Models for the three last strategies [A2.2] *Experience-based, such as experience in group management, counselling, previous success, and so on.*, [A2.3] *Rota-based, in which each member serves as a moderator for a period of time* and [A2.4] *Performance, such as those who demonstrate a willingness to support others, enhancing personal wellbeing score, and so on within this section* were non-significant.

7.3.4.3 MODERATOR SKILLS

We found that none of the [A3] moderator skills models were significant for the three outcome measures related to this subject, which were [A3.1] *had a mental health problem in the past and recuperated from it*; [A3.2] *High communication skills (verbal and nonverbal, diplomacy, motivational words, and so on)*; [A3.3] *knowledge, such as behavioural change, management, and leadership abilities*.

7.3.4.4 MODERATOR AUTHORITY

The analysis discovered that one of the section's models was significant in terms of [A4], the moderator authority peer group. The model for [A4.1] *Manage membership, such as adding new members and excluding those who break the rules, among other things*.

In terms of [A4], the moderator authority in the peer group, the analysis found that one of the section's models was significant. The model for [A4.1] *Manage membership, e.g. adding new members and banning members who violate the rules, etc.* ($R^2 = .146$, $F(10,160) = 2.74$, $p = .004$) accounted for 14.6% of the variance was significantly predicted by the single predictor of conscientiousness ($\beta = .185$, $p < .01$). As such, acceptance of this strategy increased as conscientiousness increased. The other two models [A4.2] *To ban members from doing certain activities, e.g. banning video games and social media late at night* and [A4.3] *To set up the online environment, e.g. the colours, the forum subject, the sounds, and the reminders* were not significant.

7.3.4.5 ABILITY AND RESPONSIBILITY TO APPLY REINFORCEMENT FUNCTIONS

The responsibility of [A5] the moderator to issue incentives and penalties has four models. Two of the models in this section were found to be significant by the regression analysis. The result of [A5.1] *Rewards to groups members based on the improvement of their performance* model ($R^2 = .150$, $F(10,160) = 2.19$, $p = .021$) accounted for 15.0% of the variance and was significantly predicted by agreeableness ($\beta = .089$, $p < .05$), conscientiousness ($\beta = .121$, $p < .05$) and self-control ($\beta = -.025$, $p < .05$). As a result, acceptance of this strategy rises, as well as agreeableness and conscientiousness. Acceptance of the strategy, on the other hand, decreases as self-control

increases. The outcome of [A5.3] *Rewards based on the online group member's interactions, such as helping others, and so on.* model ($R^2 = .110$, $F(10,160) = 1.98$, $p = .039$) agreeableness ($\beta = .100$, $p < .05$) and conscientiousness ($\beta = .102$, $p < .05$) also significantly predicted this variable, which accounted for 11.0 percent of the variance. The other two models in this section [A5.2] *Penalty for poor performance* and [A5.4] *Penalty based on the member interactions within the online group, e.g. distracting others*, were not significant.

7.3.4.6 MODERATOR TASKS

[A6] Moderator has three tasks, and each task has several models: [A6.1] *Moderator ability and responsibility to track the group members.* One of the moderator responsibilities is to keep track of the group members, which was analysed using two models. The results of the regression analysis indicate that one of the models in this section was significant. The result revealed that [A6.1.2] *Access data around members communication style, e.g. reports showing members to be supportive, distractor, digression, and so on.* model ($R^2 = .122$, $F(10,160) = 2.22$, $p = .019$) accounted for 12.2% of the variance, with two predictors significantly adding to the model: conscientiousness ($\beta = .138$, $p < .05$), and self-control ($\beta = -.031$, $p < .05$). As a result, as conscientiousness increased, acceptance of this strategy increased; however, as self-control increased, acceptance of the strategy decreased. In the other model in this section [A6.1.1] *Access to data about members' performance, such as achievement of targets and progress towards them*, was not significant.

[A6.2] Moderator ability and duty to manage performance goals. There are five models for the moderator's role in managing performance objectives. The three models in this section were found to be significant by regression analysis. The model [A6.2.1] *specify members performance goals* ($R^2 = .118$, $F(10,160) = 2.31$, $p = .024$) accounted for 11.8% of the variance and was significantly predicted by conscientiousness ($\beta = .087$, $p < .05$), and self-control ($\beta = -.025$, $p < .05$). Acceptance of the strategy, on the other hand, decreases as self-control increases. As a result, as conscientiousness grew, so did acceptance of the strategy. The outcome of [A6.2.3] *The strategy of Review goal attainment with members frequently* ($R^2 = .122$, $F(10,160) = 2.23$, $p = .018$) accounted for 12.2% of the variance and was significantly projected by the readiness to join online peer support groups ($\beta = .197$, $p < .05$), conscientiousness ($\beta = .096$, $p < .05$) and neuroticism ($\beta = .070$, $p < .05$). As a result, acceptance of the strategy increased as readiness to participate in online peer support groups and neuroticism rise; however, Middle Eastern respondents were substantially less likely to embrace acceptance of the strategy. The other three models in this section were not significant: the results of [A6.2.2] *Modify goals for members, e.g. grant an extension*, [A6.2.4] *Discuss obstacles to goals attainment with members, e.g. resolving conflicting goals* and [A6.2.5] *Send members personalised best practices and guidance on how to attain goals*.

[A6.3] Moderator responsibility and permission to provide feedback to members. The study discovered that two models within the section were significant in terms of the moderator providing feedback. The model for [A6.3.2] *Send feedback about self-progress to members, e.g. their self-improvement* ($R^2 = .118$, $F(10, 160) = 2.13$, $p = .024$) accounted for 11.8% of the variance was substantially predicted by the single predictor of self-control ($\beta = -0.025$, $p < .05$). As a result, the acceptance of the strategy increased, while self-control decreased. The model for [A6.3.4] *Choose the communication channel to use with members, such as text, audio, non-verbal such as emoji, chat, and so on* was significant ($R^2 = .145$, $F(10,160) = 2.71$), $p = .004$), accounting for 15% of the variance, significantly predicted by the three predictors, i.e. culture, extraversion, and openness ($\beta = -.494$, $p < .05$), ($\beta = -.131$, $p < .05$), ($\beta = -.117$, $p < .05$). As a result, both extraversion and openness increased, while strategy acceptance decreased. There was substantially greater acceptance of this strategy in the UK than in the Middle East.

The model for [A6.3.5] *Chooses the framing and the tone of the feedback, e.g. guidance, assertive, strict, friendly, etc.* was significant ($R^2 = .144$, $F(10,160) = 2.68$, $p = .005$), accounting for 14.4% of the variance of the model. This was predicted by culture and self-control ($\beta = -.286$, $p < .05$) and ($\beta = -.31$). As a result, as self-control decreased, acceptance of this strategy grew, and the strategy was substantially more likely to be adopted in the UK than in the Middle East. Both models for [A6.3.1] *send feedback about how the group is performing as a whole, i.e. collectively*, and [A6.3.3] *send feedback to members about their interaction, such as being seen as a helper or distractor* were not significant.

7.4 DISCUSSION

The significant regressions accounted for about 12 – 15% of the variance in each outcome measure. As a result, they, in part, explain the reported attitudes and views, albeit to a relatively minor extent. Consistently among the significant predictors were the two personality traits of agreeableness and conscientiousness, as well as self-control. This is perhaps unsurprising, given that these predictors may be possibly linked to an individual's willingness to be a part of a group and have their behaviour shaped and controlled by other members of that group.

It is worth remembering which predictors were not found to be significant. The model for a preference for a human moderator, software, or a combination of both was not significant. This is in contrast to numerous models of technology acceptance. It could be expected that individuals may not react to technology-based agents in the same manner as human group members (Taherdoost, 2018). Also, it has been discovered consistently throughout social psychological research that people show prejudices when comparing their abilities and skills to that of their peers, for example, (Olson and Ross, 1988). Concerning the present study's findings, this may indicate that individuals do not distinguish between a human moderator and a software-based moderator. In various domains, including health information management (Hunt, 2014), research

into the leader-member exchange theory has shown that the relationship between a leader and a group is complicated, with group members' views on how the group should be handled. Despite this, the regression models for the moderators' skills (knowledge, leadership communication) did not show any significant results. Given this, it is worth noting that none of the predictors seemed to distinguish between human and technology-based group moderators.

The model for moderator selection based on a voting system was significant. However, while the usefulness of this strategy was viewed as a positive predictor, members' readiness to join such a group was a negative predictor. This may mean that people understand the advantages of the democratic process of electing the moderator by an election but do not actually want to be exposed to the effects of that voting process. This may relate to the desire to emphasise uniqueness, which refers to the drive people have to show that they are not bound by social rules (Imhoff and Erb, 2009). This could reveal an awareness of the part of the respondents of the phenomena of groupthink, in which groups are found to make more risky, extreme and sometimes objectively worse decisions than people do alone (Schafer and Crichlow, 1996). Avoiding unintentional effects like these are, of course, one of the fundamental reasons why the group would have a moderator in the first place. Nonetheless, given the relative novelty of moderator-facilitated online peer support groups, it is possible that when asked about this, respondents had difficulty knowing what was meant.

According to drive theory, social facilitation happens when the participation of an audience enhances performance (Zajonc, 1965). This may explain, in part, the significant regression model, which showed that agreeableness and conscientiousness personality traits were positively related to the group's reward acceptance. Nonetheless, it was also noted that increased self-control seemed to decrease the acceptance of this strategy. This recommends a trade-off between the willingness to involve in this strategy and the need to retain personal freedom and control. Related to this is evaluation apprehension, in which performance is adversely impacted by the presence of others (Platanis and Moran, 2001). This could account for the non-significant regression models relating to assigning penalties to members for poor performance, i.e. individuals could be receptive to the idea of group monitoring provided that this is not related to assessment or punishment. This is consistent with previous research, which shows that although being a part of a group typically reduces evaluation apprehension, this only happens when the person knows they will not be evaluated individually (Crisp and Turner, 2017). Individuals in online peer support groups may feel that their acts are highly quantifiable and traceable, raising their fear of being judged. In online peer support groups, people may feel that their actions are highly quantifiable and traceable, leading to increased evaluation anxiety.

Research on the relationship between personality and preferred group moderation characteristics in online or offline settings is limited. Some research on personality and management styles within

organisations relevant to this study, such as (Dai et al., 2019), established that openness and conscientiousness contributed to group performance when managed appropriately. In some of the regression models performed within this study, both personality traits were significant predictors. However, some other personality traits were not significant predictors in any of the models. This involves neuroticism, which refers to having emotional feelings such as anxiety, fear, frustration, and loneliness. Given the existence of the proposed online peer support groups and the probability, as mentioned earlier, phenomena like apprehension assessment occurring, it is strange that this personality trait was not a significant predictor.

The overall pattern of findings was reflected concerning the group moderator's tasks, responsibilities, and powers. The significant predictors with the significant models usually include self-control and the personality trait of conscientiousness. These findings can be compared to previous research on power and group dynamics in groups. It has been observed, for example, that members of a group expect others in positions of leadership to follow the social norms of that group (Stamkou et al., 2019). This reflects participants' comments that they would follow the moderator's rules and permissions as long as they are transparent and fair. Participants from the UK were more likely to want to monitor how these activities and permissions were controlled. This is in line with research from Hofstede Insights, which suggests that the UK scored higher on individualism and power distance than the Kingdom of Saudi Arabia and Syria (Hofstede, 2019). However, this relationship between culture and power within-group leadership roles has been discovered to be a difficult one. For example, leaders who break norms in individualistic cultures are seen as more dominant.

Similarly, identification with the group is linked with a stronger sense of responsibility for the group's wellbeing (Scholl et al., 2018). This emphasises the importance of those individuals who have authority within the group investing in that group. Finally, it was noted that some participants expressed a preference for blunt and authoritarian styles of communication from the moderator, given that, as previously mentioned, this did not contradict the group's expectations and social norms. In sports psychology research, although prescriptive and authoritarian approaches to behaviour change are increasingly seen as obsolete, they can still be useful in some situations, especially when it comes to deviation from desired behaviour (Delrue et al., 2019).

Previous research on gender shows that male and female make different use of social support networks to control behaviour change (Matud et al., 2003), including within internet support groups (Strøm et al., 2019). Gender was not a significant predictor in any of the significant regression models; this was not the case in this research. Similarly, culture was not a significant predictor in most models. These are both elements that could be expected to affect attitudes towards peer group hierarchies and purposes. As a result, it is of interest that they seemed to be of relatively minor importance regarding online behaviour change for peer support groups in this

study. Again, there is limited research on this topic, with little understanding of how cultural factors affect group dynamics (Van Zomeren and Louis, 2017). This may reflect a criticism made of psychological research that relies significantly upon student samples from Western countries (Henrich et al., 2010). The research represented in this study contributes to reducing this gap.

Overall, multiple predictors within the regression models presented in this study should, as based on previous psychological research, be reasonably expected to predict attitudes towards online peer groups moderation significantly. The fact that they did not is essential, both in terms of our theoretical understanding and the practical implementation of such systems. As defined by (Suler, 2004), the online disinhibition effect raises the question of whether the internet improves or transforms; that is, whether it causes individuals to act in fundamentally different ways while they are online if it enhances pre-existing traits and processes. This is not a question definitively addressed in the research literature. As this study shows, further is needed if effective and suitable behaviour change systems are to be created.

In terms of functional governance factors, most of the regression models were not significant. The significant predictors with such models were mainly personality traits, e.g. extraversion, agreeableness, and conscientiousness. These occurred in the anticipated direction, such as a rise in extraversion being linked to acceptance of a peer group in order to increase engagement in the management of a digital addiction issue. Also, self-control, a significant negative predictor such as increased self-control, seemed to decrease the acceptance of this strategy.

The model for comparing performance reports was significant, which found that the personality traits of agreeableness positively predicted. The reinforcement function has two significant models. The model for *recognising top performer, e.g. leader boards for weekly performance*, was significant. However, it is notable that conscientiousness's personality traits were positively predicted; extraversion and agreeableness were negative. The significant regression for the model *Adjusting the score and level of members based on performance and interaction* was to find the perception of the usefulness of this strategy was a positive predictor. However, it was also noted that increased self-control seemed to decrease the acceptance of this strategy. The model for a feedback source from peer member, moderator or software being human software was not significant. In term of feedback subject, the model for *how I am achieving long term goals; how others are performing with their goals; how my current status compares with my status when I joined the group; how others current status compares with their status when they joined the group* was not significant.

The model for feedback communication was significant through *one-to-one chat with the moderator*, although the significant regression model discovered that the personality trait of neuroticism positively predicted. The model for *on-verbal cues, e.g. emoji and changes in the colour scheme*, was significant. However, it is notable that the personality trait of

conscientiousness and the readiness to join such a group were negative predictors. At the same time, it was also noted that increased self-control seemed to increase the acceptance of this strategy. Querying the software about performance and feedback when I like to do so: this model was significant. Notably, the personality trait of extraversion was a positive predictor, and gender was a negative predictor. The model for feedback tone was significant through mentions both positive and negative sides was significant, although the significant regression model discovered that the personality traits of extraversion positively predicted. The model for performance goals was significant through the model short-term goals was significant. However, it is notable that while the perception of the effectiveness of this strategy was a positive predictor, the readiness to be part of such a group was a negative predictor.

In the governance functional, the descriptive analysis showed that most of the responses view the comparison and the reinforcement functions as essential in the design of an online peer group. Also, more than half of the respondents agree to set performance goals in the group. Concerning performance feedback, most responses agree that the feedback source comes from peers, moderator, and software. Also, most of the responses agree on feedback subject on how they are achieving short-term goals and long-term goals and feedback on how their current status compares with their status. Concerning feedback communication, half of the respondents disagree with non-verbal cues feedback and frequent message feedback.

In non-functional requirements, the descriptive analysis showed that the percentage of respondents agree on the four components of the performance tracking system in the online peer group. The analysis indicated that more than half of respondents agree on self-report tracking, automated tracking system, hybrid tracking and peer reporting. The participants' opinion about the role they would like to take in the online peer group; the analysis showed that most respondents agree with their role to be a group member in the group. Moreover, the analysis showed that 37% of the respondents agree to be group moderators. A similar percentage of respondents disagree to be a group moderator. Also, 41% of respondents agree to take both moderator and group member role.

In term of group membership, the descriptive analysis showed that 42% of the responses disagree with the friendship members, and 34% agree that the group member is friendship. Also, 45% of respondents agree that the group members have similar demography, and more than half of the respondents agree that the members have a similarity of personality and profile. Also, most respondents disagree that the group members have similar wellbeing, but respondents agreed that the group members have a similar problem. Moreover, more than half of the respondents agree on group membership with similar wellbeing issues and similar wellbeing issues. In relation to member leave the group, the descriptive analysis showed that the majority of respondents agreed members should declare in advance if they want to exit the group, a member should give a reason

for leaving the group and member who violate the group norms and mission should be forced to exit the group.

Moreover, in terms of a member leaving the group when failing to achieve the group target, most responders agree that the member, moderator and software can decide for the member to leave the group. In relation to who can decide if the member should exit the group when they violate the group rules and mission, most respondents agree with the moderator, the software-based on the data report about performance and group vote based on a recommendation by some members or by the moderator. Regarding restrict visibility from other members, most of the respondents agree that the profile, feedback, and performance data have restrictions.

In terms of non-governance functional requirements factors, most regression models failed to show any significant results. Personality characteristics including extraversion, openness, and neuroticism were the most significant predictors in these models. Also, extraversion and self-control, a negative significant predictor such as, for example, increased self-control, appeared to reduce the acceptance of this strategy.

The exiting procedure strategy model for who make decisions to leave the group the regression, it is interesting to note that none of the models was significant which is members should declare in advance if they want to exit the group, so others become prepared; members who decide to leave the group spontaneously should give a reason to other members and members who violate the group norms and mission should be forced to exit the group.

The exiting procedure strategy model for who should decide if a member can leave the group when achieving all his/her target, the regression analysis indicates, was significant. However, while the personality trait of openness was a positive predictor, the extraversion and the perception of the effectiveness of this strategy was a negative predictor. The model for who can decide if the member has to leave the group when he/she violates the group rules and mission was significant through the moderator. The significant regression model found that the culture was a positive predictor, although it was also noted that the personality trait of extraversion and self-control was a negative predictor.

Concerning membership criteria, the significant model of the membership criteria was similar to other models of wellbeing issues. It is interesting to find that the personality trait of openness was a positive predictor, although self-control seemed to decrease this strategy's acceptance. In terms of privacy strategy, the regression analysis found that my profile data model was significant. However, while the perception of the effectiveness of this strategy and the personality trait of neuroticism was a negative predictor, the personality trait of agreeableness was the positive predictor. The model for the tracking system by self-report, automated and hybrid, it is interesting to note that none of the tracking system models was significant.

This chapter describes the statistical analysis of the data that was collected from the survey. The survey questions were designed to validate the qualitative findings on the variability design preference of online peer group design explored in Chapter 5. Also, we explained how we used linear regression analysis to gain a better understanding and measure the effect of gender and culture in the UK, and the Middle East, perceived usefulness of peer support groups; readiness to join a peer support group; the five personality traits; and self-control on different preference to the design of online peer group.

8. CHAPTER 8: EVAVAR METHOD AND ITS EVALUATION

The online peer support system structure aims to assemble a group of people who have a common interest in tackling digital addiction and create peer groups where people with similar interests can gather to help and influence each other's actions. This thesis proposes the potential factors that could affect users in accepting or rejecting online peer group platforms and the variabilities design features of the online peer support group. These factors are described in previous chapters of the thesis. Chapter 4 presented the acceptance and rejection factors of online peer support groups, and Chapter 5 presented the different variability space of online peer group design requirements. This chapter conducts validation of chapters' 4 and 5 findings to ascertain the extent to which the findings can help users define their configuration of the online peer support group and help increase the chances of achieving successful and actable design for online peer support group platforms. This chapter will propose evaluation of the design features and the acceptance and rejection factors of design configuration process of the online peer group, we called the materials EVAFAR (EVA=evaluation, F= Features, A= Acceptance, R= Rejections). To evaluate these materials, a qualitative case study is used. This chapter discusses objective four of the thesis.

8.1 EVAFAR MATERIAL AND STEPS

Here, templates, guidance and recommendation generated based on Chapters 4 and 5 findings should be used. Chapters 4 and 5 discussed the acceptance and rejections factors and the variabilities design features of online peer support group. These templates, guidelines and recommendations (EVAFAR) are proposed to enhance the configuration of the design features of the online peer support group and help the designers to determine the acceptance and rejections factors that would be useful in the design of the online peer support group. The templates are created following the checklist-based approach, i.e., various options are provided on the templates, and the users are required to select the options or make choices that apply to them by ticking boxes. The order of the templates and the checklists are essential. The templates will be provided to the users starting with key aspects first, e.g., the privacy template cannot be provided at the end because everything depends on it. The templates provide a process that the users need to go through and have structured conversation to help them make their choices. Also, the designers should follow the design steps, e.g., the steps for the negotiation process and instructions on how to reach an agreement regarding the factors that would increase the user's acceptance and rejections and the design configuration for the online peer group.

In order to use EVAFAR materials, the steps presented in Figure 71 should be followed. The first step of the process is about identifying the stakeholders who would take part in the design process. The second step is about introduce and explain the problem to the stakeholders. The third step is about providing the acceptance factors templates (see Table 22 and Appendix 3 Documents 3)

and the recommendation document in Table 23 The representative users are expected to follow the consensus decision-making process to reach an agreement between them (see Figure 72). After reaching an agreement, the representative users will move to the next step. The fourth step about providing the rejections factors templates (see Table 23 and Appendix 3, Document 4) and the recommendation document (see Table 22), The representative users will go through the consensus decision-making process in Figure 72 to reach an agreement between them and then move to the fifth step. The last step is about configuring the design features of the online peer group. The participants will be provided with templates depicting the online peer group design features (See Table 24 and Appendix 3, Document 5, 6, 7 and 8) and guidelines document (See Table 25), The participants will follow the consensus decision-making process (see Figure 72) to reach an agreement about the configuration features of the online peer support group.

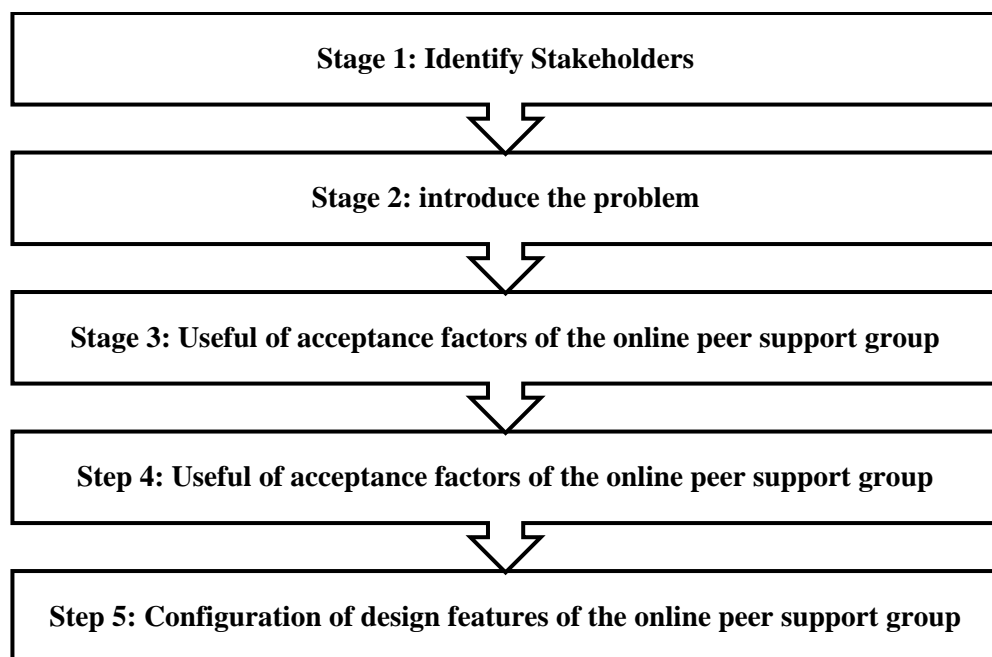


FIGURE 71EVAFAR STEPS

TABLE 23: THE ACCEPTANCE FACTORS

Dialogue	
Template ID: 1	Acceptance Factors
Acceptance Factor F1: Entertainment mechanism	
What entertainment features would increase your acceptance to join online peer group?	
Award as entertainment	
<input type="checkbox"/> Awards when achieving behavioural targets (e.g., points, badges, etc.). <input type="checkbox"/> when making progress towards the behavioural target. <input type="checkbox"/> Penalty (e.g., reduce point, reduce levels, etc.) <input type="checkbox"/> Gamification mechanism on how I am progressing to keep user engage (e.g., progress bar, leader boards, badges. Points, etc.). <input type="checkbox"/> Others (Please Specify)	

Elaborate on why the selected features would increase entertainment and the reason of increasing your acceptance of online peer group?	
Selected features	Reason
Peer comparison as entertainment	
<input type="checkbox"/> Peer comparisons, i.e. see how I and others are performing. <input type="checkbox"/> Peer comparison should be competitive between group members i.e. there are winner and loser members. <input type="checkbox"/> Compare progress with members who has similar level of digital media usage. <input type="checkbox"/> Peer comparisons, i.e. see how I and others are performing <input type="checkbox"/> Peer comparisons based on group goals and target i.e. see how I and others are performing toward group goals and targets. <input type="checkbox"/> Other (please specify)	
Elaborate on why the selected features would increase entertainment and your acceptance of online peer group?	
Selected features	Reason
Goal achievement as entertainment	
<input type="checkbox"/> The goals should be set as an achievable goal. <input type="checkbox"/> The goals should have more than one target. <input type="checkbox"/> The group should have monitor system to monitor members achievement toward the target goals. <input type="checkbox"/> The system should provide rewards such as “points” based on goals achievement. <input type="checkbox"/> Group members should set up the goals and target. <input type="checkbox"/> Other (please specify)	
Elaborate on why the selected features would increase entertainment and your acceptance of online peer group?	
Selected features	Reason

TABLE 24: ACCEPTANCE AND REJECTIONS FACTORS RECOMMENDATIONS

Recommendation 1: Peer comparison features should be designed as entertainment and to raise awareness.

Users prefer the design of the peer comparison feature to be fun and have some element of entertainment function. The peer comparison feature is about comparing user goal achievement and progress that would help to raise user awareness about their problematic digital media usage. The system should compare a peer with group peers who have a similar level of

problematic online behaviour. However, the system should avoid comparing peers who have similar achievement and goal progress.

- The system should provide anonymous information and details when presenting the comparison progress report.
- Comparing progress and achievement with peers who have a similar problem and share similar interests or occupation would help raise awareness. The system should persuade users who have low progress by using motivational language and avoid affecting their emotion.

Recommendation 2: Goal's achievement should be designed as an entertainment and to raise awareness.

The goal achievement feature should be designed to be fun by using some of the entertainment tools such as leader-board, points and levels. Also, if a user cannot achieve or have difficulties to commit to the goals this would help raise awareness of their problematic digital media usage. However, if users face complex and conflicting goals, they should ask the group moderator to provide support.

- Peers should avoid conflicting and difficult goals. At the same time, the goals should not be easy.

Recommendation 3: Providing goal performance feedback

The group moderator and peers should provide advisable and judgemental feedback. The feedback should be regarding performance toward the goals, peer goal achievement with other group peers or interaction with other members. The feedback could be judgemental but not praise the user.

- Judgemental feedback may affect user emotion; therefore, the judgemental feedback may use motivational language.
- The feedback should be framed to encourage users to change their digital media usage and include advice and guidance.

Recommendation 4: Award and penalty

Users considered the award to be fun and an entertainment tool in the online peer group design. However, the award itself would not make the group fun and competitive, but the award and penalty would help achieve fun and entertainment. It would also encourage users to achieve group goals and be aware of their progress, whether good or slow.

- Avoid harsh penalty in the group because they may affect users emotionally. The award and penalty in the group should be reasonable.

Recommendation 5: Democracy and harsh penalty

The group moderator and management should manage the group to be democratic, e.g. members should not be forced to stay or leave the group. However, the group moderator should have the ability to ban members who violate the group rules or do not achieve any goal progress because this is not against the group democracy. The governance protocol here should be agreed upon by all group members.

- Temporarily or permanently, ban members who disrupt other members by sending annoying messages or feedback.
- The system should support the moderator to provide harsh penalties, such as temporarily or permanently banning members who do not achieve any goals progress as this is not against the democracy and weak management.

Recommendation 6: Trust between group members

The system should provide a high level of privacy and trust. If the group members are unknowing (i.e. strangers) peers, some features could be against privacy, affecting trust between members. For example, sharing goals achievement, comparing progress, receiving feedback from peers and sharing stories, knowledge, and experience. However, sharing information with strangers would affect trust; thus, members might be sceptical about sharing their stories and experience.

- Avoid joining a group with strangers and share stories, knowledge, feedback, and goals with them.
- Avoid allowing member to join the group with completely anonymous profile

TABLE 25: ELICITING THE REJECTION FACTORS

	Dialogue
Template ID: 2	Rejection Factors
Rejection Factors R1: Intimidation	
What are the intimidation tools would you reject it in the online peer group?	
<input type="checkbox"/> Harsh Penalty (i.e. block from group if the user could not achieve the group goals or target, write member name who does not achieve the goals target in the main page of the platform. <input type="checkbox"/> Negative feedback (i.e. use harsh language) e.g. you have repetitively failed in achieving your target, this is the 5th time this month. <input type="checkbox"/> Harsh feedback, e.g. Your interaction with peers shows anti-social and disruptive patterns. You have been reported for annoying others. <input type="checkbox"/> Other (please specify.....)	
<div style="border: 1px solid black; padding: 5px;"> Elaborate on why the selected features could make you reject the online peer support group? </div>	

Selected feature	Reason
Rejection Factors R2: Overly judgment	
What types of judgements would you reject in the online peer group?	
<input type="checkbox"/> Reject a group if the group moderator judges my performance and interaction frequently (i.e. the moderator overly judge member who exceed the usage target). <input type="checkbox"/> I reject a group if the judgement online expands to other life aspects by peers who are real-world contacts. <input type="checkbox"/> Reject a group if I am judge by peers who are only online contact, e.g. not real-life contacts. <input type="checkbox"/> Reject a group if I am judge by online peers who are also real-world contacts. <input type="checkbox"/> Other (please specify).....	
Elaborate on why the selected features could make you reject the online peer support group?	
Selected feature	Reason

TABLE 26: GROUP MODERATOR FEATURES

Dialogue

Template ID: 3	Moderator Role	
In terms of the nature of the moderator; what is the nature of moderator you prefer		
<input type="checkbox"/> Software, e.g. automatic target calculation and giving advice. <input type="checkbox"/> Human <input type="checkbox"/> Blended, i.e. human and software together		
In terms of moderator authority in the online peer group, what kinds of authority would you like the group moderator to have?		
<input type="checkbox"/> Manage membership, e.g. adding new members and banning members who violate the rules, etc. <input type="checkbox"/> Ban members from certain activities, e.g. banning video games and certain food at night hours, etc. <input type="checkbox"/> Set up the online environment, e.g. the colours, the forum topics, the sounds, the reminders, etc.		
Nature of Moderator	Authority	When to apply
In terms of the moderator responsibility to issue rewards and penalty, what type of reinforcement function you would like the group moderator to issue.		
<input type="checkbox"/> Rewards to members based on the improvement of their performance. <input type="checkbox"/> Rewards based on the member's interactions within the online group, e.g. helping others, etc. <input type="checkbox"/> Penalty based on the poor performance. <input type="checkbox"/> Penalty based on the member interactions within the online group, e.g. distracting others, carelessness, etc.		
In terms of the skills, what moderator skills should the moderator have?		
<input type="checkbox"/> Had the well-being issue themselves in the past and recovered from it.		

<input type="checkbox"/> Experience in the domain, e.g. behavioural change, management and leadership skills. <input type="checkbox"/> High communication skills (verbal and non-verbal, diplomacy, motivating language, etc.).															
In terms of the strategy of allocating a human moderator, what strategy would you like to allocate moderator.															
<input type="checkbox"/> Voting by members. <input type="checkbox"/> Experience, e.g. in group management, counselling, previous success, etc. <input type="checkbox"/> Rota-based, i.e. each member becomes a moderator at some stage. <input type="checkbox"/> Performance, e.g. being helper to others, enhancing personal digital media score, etc.															
<table border="1"> <thead> <tr> <th>Strategy of allocating moderator</th> <th>skills</th> <th>When to apply</th> </tr> </thead> <tbody> <tr> <td>Voting by members</td> <td></td> <td></td> </tr> <tr> <td>Experience</td> <td></td> <td></td> </tr> <tr> <td>Rota-based</td> <td></td> <td></td> </tr> <tr> <td>Performance</td> <td></td> <td></td> </tr> </tbody> </table>	Strategy of allocating moderator	skills	When to apply	Voting by members			Experience			Rota-based			Performance		
Strategy of allocating moderator	skills	When to apply													
Voting by members															
Experience															
Rota-based															
Performance															
In terms of monitoring system, what type of monitor you should the moderator															
<input type="checkbox"/> Access the data about members performance, e.g. achievement of goals and progress made towards them. <input type="checkbox"/> Access data around the style of communication of members, e.g. reports indicating members to be helpful, distractor, digression, etc.															
Is there any additional information that you think should be considered here?															
<p>.....</p> <p>.....</p>															

TABLE 27: DESIGN GUIDELINES OF THE VARIABILITIES FEATURES OF THE ONLINE PEER GROUP

<p>Guideline 1: Allocate moderator based on rota strategy</p> <p>If the strategy for allocating group moderator is designed to be rotated between group members, some functions are excluded and hindered by the rota-based-moderator. The rota based <i>exclude</i> function is:</p> <ul style="list-style-type: none"> • Provide feedback based on members performance and progress toward the goals. <p>The moderator functions will be hindered from the rota-based moderator because the group should have a high level of privacy and prevent group peers from accessing other members goal performance and interactions. The features <i>hindered</i> from the rota-based-moderator are:</p> <ul style="list-style-type: none"> • Ban a member who does not achieve any progress. • Provide penalty-based goal performance. • Send warning feedback to users who have low progress.
<p>Guideline 2: Allocate moderator strategy based on experience</p> <p>In order to allocate a moderator based on experience, the moderator skills function is required, i.e., domain experience, management leadership and communication skills.</p>
<p>Guideline 3: Monitoring system function</p>

The monitoring system functionality monitors group members' goals achievement, goal progress and interaction. The functions that *require* the monitoring system function are:

- Reinforcement function (reward and penalty) based on member interaction and performance by the group moderator.
- Tracking user performance.
- Feedback provided by the moderator regarding the member's progress, achievement towards the goals, and member's interaction.
- Review and modify the individual or collective member goals.
- Lock application or ban members who violate the group rules or distracts other members.
- Privacy and users should decide what data should be revealed from their profile and their performance visibility.

Guideline 4: Comparison function

The comparison function compares member performance with past performance, group member performance, and specific members with other members. The functions that require the comparison function are:

- Reinforcement function.
- Feedback regarding the performance and goals achievement.
- Privacy and the users should decide who can see their performance, i.e. the moderator or both moderator and peers.
- The comparison function for comparing user self-past performance, group member performance or specific member performance.
- Ban member based on comparing member to their self-past performance or group member performance.

8.1.1 CONSENSUS DECISION MAKING PROCESS

In order to use the EVAFAR materials, the consensus decision making stages will be employed to reach an agreement within the group about the acceptance and the rejection factors and the design features of the online peer group. The EVAFAR steps aim to empower the representative users and enable them to voice their opinions and objections then negotiate their preferences to reach a consensus 'win-win' agreement that the representative users accept. The diagram in Figure 72 shows the process for reaching an agreement. A vital aspect of the process is ensuring that every representative user express their viewpoints clearly and for the group to reach an agreement on the common ground and resolves different opinions. The diagram presented in Figure 72 shows

the stages that guide the consensus decision making, starting from introducing the issue till the representative users reach an agreement.

Moreover, the process steps are not always linear; they could be repeated in some stages, which would help the representative users meet their needs. The process starts with introducing and clarifying the issue to helping representative users familiarised with the supporting materials. This would ensure that each representative user understands the problem and questions that need to be discussed and clarified to everyone.

Stage three is a key step in the process, and it includes starting the discussion and making sure that everyone can share their viewpoints, feelings, and needs before finding a resolution. After the discussion, the representative users collect and explore all the ideas, and then they move to the next stage. The next stage would help the representative users to understand others need, preference and concern. After this, the representative users should look for common ground for some options and eliminate others. The next step involves clarifying and modifying the proposal that would help to tackle any remaining issues. The final stage involves testing for agreement between representative users by clearly stating the last proposal and checking whether there is agreement or disagreement by asking whether anyone is against the proposal. If there is disagreement and the representative users do not have a consensus, then move back to the earlier stage in the process.

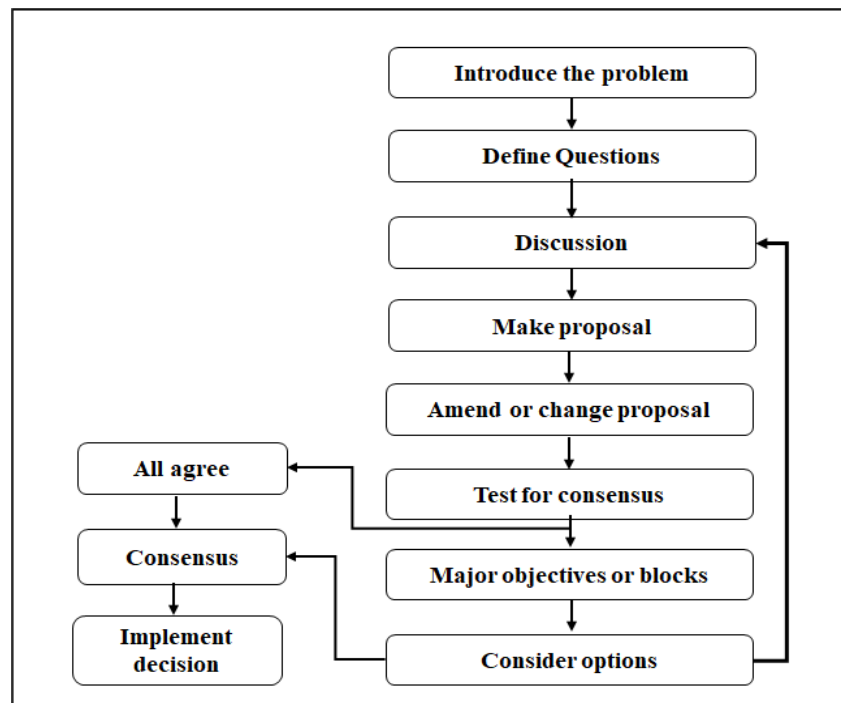


FIGURE 72: CONSENSUS DECISION MAKING FLOWCHART (Lunenburg, 2010)

8.1.2 BENEFICIARIES OF THE EVAFAR MATERIAL

The EVAFAR materials will be used by developers of social networks applications, such as Facebook who would like to build or provide an online peer support group to their users who are seeking to regulate their problematic usage. A site like Facebook would not want to provide all the features in the new online peer support group because this may not be effective for them, in terms of time and finance. Therefore, a Facebook-like site shall invite representative users to focus group sessions and go through the proposed materials with them. As a result, they would establish which functions users would like to see in the new online peer support group, i.e., typical or default configuration. For example, a user does not want negative feedback, or the feedback goes with comparison. This would help a Facebook-like site to know how they would present the peer support groups to users without having to configure them later. This informs the design of the online peer support group features and functionalities to help support the behavioural change process. Because the acceptance and rejections factors and the design requirements gathered would lead to the design or configuration of features and functionalities for the new or existing online peer support group.

Second, there is an existing online peer group. For example, game quitter (<https://gamequitters.com/>) or gambling therapy (<https://www.gamblingtherapy.org/>) have an online peer support group with all the features and functionalities and the counsellor or moderator would like to configure the platform to meet the need of the group members. So, to know the preference of the group members, the counsellor invites them to go through the proposed materials and the steps provided and customise the online peer support group. The counsellor conducts this session before they configured the online peer support group for each group because all the features cannot be provided. This would help the counsellor establish which functionalities they shall remove or deactivate from the online peer support group, e.g., harsh penalty.

8.2 UNDERSTANDING THE EVAFAR PROCESS

The proposed materials provide knowledge to apply and steps to follow for the configuration of design features of the online peer support and usefulness of acceptance and rejections factors. The following will provide description of the EVAFAR steps.

8.2.1 STEP 1: IDENTIFYING STAKEHOLDERS

In order to use the EVAFAR materials, several steps need to be considered. The first step involves identifying the various stakeholders who will participate in the configuration of the design features of the online peer group and the usefulness of the acceptance and rejection factors. Before starting the configuration process, the system analysts should identify the stakeholders who will partake in the process. A set of five stakeholder types shall configure the online peer group using the EVAFAR materials, and the representative users who participate in the configuration process.

Table 28 shows the stakeholders who are directly involved with the EVAFAR method. After identifying and recruiting the stakeholders, the analysts can start the process by familiarising the participants with the supporting documents, in Appendix3 and then provide the induction document, i.e. Document 1. The induction will help representative users to familiarise themselves with the required documents. The analysts will clarify and explain some of the templates, and the representative users should complete the templates.

TABLE 28: STAKEHOLDERS, DEFINITION AND LEVEL OF INVOLVEMENT

Stakeholder	Definition	Level of Involvement
Representative users	Refers to help-seekers, i.e. users who declared to have problematic social media usage.	They actively participate in all elicitation stages.
System analysts	The system analyst is responsible for gathering, observing and analysing users acceptance and rejection factors as well the configuration design features of the online peer group. The system analyst is a specialist in software engineering and computing, and also has some knowledge in psychology, human factors, user experience and usability.	Leads the evaluation process and is diligently involved in all the stages.
Designer	Refers to the person who is responsible for designing the interfaces and interactive features of the online peer support group.	Designers do not participate in the discussion with users but implement the results of the configurations.
Developer	Refers to the individuals who are responsible for developing the online peer group features. They can assess any possible limitations relating to the development of the platform.	Developers do not participate in the interaction with users.
Psychologist	Refers to the individuals who have psychological experience and background in human behaviour, behavioural change processes and knowledge in the area of problematic behaviour. They will help the design team understand users psychological and emotional states regarding their social media usage.	They are completely engaged in all the phases of the online peer group design configuration.

8.2.2 STEP 2: UNDERSTANDING THE PROBLEMATIC USAGE

The second step aims to help the representative users understand the problematic behaviour and to have an idea about the phenomena of online peer group and DA and the associated side effect of DA. This step would help to increase representative users' knowledge about digital addiction and improve their understanding of online peer group benefits. Furthermore, in this step, representative users will be provided with an explanation some of the concepts that has been used.

In this step, the representative users will be provided with some strategies and techniques to support them during the configuration of the online peer group. In the introduction, simple

language and examples are provided to help improve user understanding. In the first part, explanations about the factors that would help users accept joining online peer group, such as awareness tools, support tools, education tool and entertainment tools, are provided. Also, to help the representative users understand the problem, a list of scenarios will be provided.

8.2.3 THIRD AND FOURTH STEP: USEFULNESS OF THE ACCEPTANCE AND REJECTION FACTORS

The third step of the EVAFAR process involves the acceptance and rejections factors and users reaching an agreement about the useful factors to accept or reject the online peer group. This step has two phases, phase one involves users agreement of the useful acceptance factors and phase two agreement of useful rejection factors. This section utilises the aspects presented in Chapter 4, which illustrate the acceptance and rejections factors. First, representative users can select their prefer acceptance factors from the acceptance tools checklists, see **Template ID1** as supporting materials, Appendix3, Document 3. Also, the recommendation documents will be provided that in Appendix3, Document 6. The tools have various categories of acceptance factors and associated elements for each factor. These tools sought to help users decide which factors would motivate them to accept joining online peer group and help them to control their digital usage. In the second phase, the users select the factors that might lead them to reject the online peer group. In this phase, the representative users are provided with the acceptance and rejections factors (see **Template ID2**) in Appendix3, Document 4 which have various categories of rejection factors and associated elements for each factor.

8.2.3.1 *STEP5: CONFIGURATION OF THE DESIGN FEATURES OF ONLINE PEER GROUP*

This step involves configuring the design features that the representative users would like to see in the online peer group to regulate their problematic usage. Here, templates and guidance generated based on the findings presented in Chapter 5 will be used. In this step, the moderator features, functional governance, and non-functional governance of the online peer group will be configured.

When configuring the group's function governance features, the representative users should be provided with the templates and the guidelines document, e.g., the templates about the features of online peer, such as goal setting, feedback and comparison. In this step, the templates indicating the source of each functional governance features will be used to direct the **process**. Template ID3, ID4, ID5, ID6, ID7 and ID8 (see **Document 5, Appendix3**) is mainly about goal setting features. The goal setting aspect is primarily concerned with helping group members set achievable goals that would assist the behaviour change process, e.g., setting proximal (short term goals) to achieve the distal (long term goals).

To configure monitoring system and the comparison features of the online peer group, **Template ID5** (see **Document 5, Part B and D, Appendix 3**), will be used to direct the representative users. The monitoring system is mainly about monitoring goal progress and group members interactions. Various monitoring options were explored in Chapter 5, e.g. self-monitoring, peer-monitoring and automated monitoring. Also, this part involves configure design features of the comparison approaches; presented and discussed in Chapter 5. This step involves defining a comparison preference for each of the set goals that would work for a particular user or group of users.

In addition, to configure the feedback features of the online peer group, **Template ID 7, Template ID 7.1 and Template ID 7.2** (see **Document 5, part E, Appendix 3**) will be used to direct the representative users. The feedback would help group members of the online peer group to be aware of their goal progress and their interaction within the group. The feedback involves four principals' approaches, i.e., feedback source, feedback subject, feedback communication and feedback framing.

To configure the reinforcement function and membership criteria of the online peer group, **Template ID 8** (see **Document 5, part F Appendix3**) will be used to direct the representative users. In this step, the representative users should agree about the membership criteria design features of the online peer group. The design features for the group membership involves membership demography, group member relationship, e.g., friends, family or strangers. Also, in this step, the representative users would agree about the reinforcement functions that should be in the design, for example, the reward if users achieve progress towards the goals. The reinforcement functions involve the source of reinforcement function, the reason for providing it and the type of the reinforcement *functions*.

To configure the privacy and exit procedure features of the online peer group, **Template ID 5** (see **Document 5, Part C and D, Appendix 3**), will be to direct the representative users. Privacy is an important factor of governance and design of the online peer group; the representative users should agree about the users who are authorised to restrict the data visibility from other members of the group. Privacy involves profile information restrictions, performance visibility and feedback visibility. Also, the group needs to agree about the exit procedure from the group and the strategy the group members should follow to leave the group. The exit procedures involve the reasons to leave the group and when members can be forced to leave the group.

To configure the moderator features and tasks for the online peer group design, **Template ID 3 and Template 3.1** (**Document 5, Part A Appendix3**) will be used to direct the representative users to agree about the moderator features. In this step, the templates represent the features of the group moderator and outlines six aspects of the moderator: the nature of moderator, moderator skills, the strategy of allocating the group moderator, reinforcement functions, moderator

authority, and moderator tasks. The moderator tasks have three aspects, i.e. monitoring system, moderator setting goals and moderator feedback. All the moderator aspects are illustrated in Chapter 5.

8.3 EVAVAR EVALUATION: AIM

This chapter evaluates the effectiveness of the qualitative findings to help users (i) express the factors which may affect their decision to accept or reject the online peer support group, (ii) identify the moderator features and tasks on the online peer support group, (ii) express their governance functional and non-functional design requirements. In addition, the evaluation will use supporting documentation by considering the following aspects:

Understandability: The aim here is to evaluate the extent to which the materials under evaluation can be comprehended, and if the documents have a satisfactory use and can be easily understood.

Comprehensiveness: The objective of comprehensiveness is to perform an assessment of how the evaluation phases cover the various activities necessitated by the design process.

Efficiency: This is evaluated to determine the degree to which end users can easily and efficiently use and follow the templates, and how much they are satisfied with the individual parts of the template.

Usefulness: The goal here is to evaluate, within the configuration process, whether the templates and supporting documents can clarify and enhance the dialogue between the system analyst and the users, and if those users want to use the templates.

Completeness: The aim here is to evaluate if the online peer group has all the evaluation materials and supporting documents needed for individuals to address their problematic usage and if the guidelines can help with the configuration process.

8.4 REASONS FOR ADOPTING THE CASE STUDY APPROACH

The thesis uses the case study method to determine the effectiveness of the requirements for the online peer support group design, which can help with the problematic use of social networks. A case study is a method of exploring a phenomenon using a variety of relevant data sources (Baxter and Jack, 2008). Case studies allow the evaluation documents to be evaluated in a natural setting, in this instance in regard to an application hosting the problematic usage. The main aim of using a case study was to investigate if it may assist users with specifying their behavioural goals with the assistance of a system analyst, in addition to observing users' interactions with the different factors of the evaluation documents; this will improve the understanding of users reactions during the elicitation process. Case studies can help to identify any flaws with the evaluated documents and the process outcomes. This thesis, using the aforementioned advantages of the case study

design, available resources, and time and type of research, uses the case study to evaluate the research findings where users were helped to express their requirements of the online peer group design.

The main stakeholder in the process is the system analyst, who can use the proposed templates and supporting materials in a real environment to evaluate the elicitation process. The case study approach helps the researcher:

- Investigate how the evaluation documents support those who want to express their design requirements of an online peer group and the provide support to them throughout the process.
- Gather participant feedback to determine the strengths and weaknesses of the evaluation documents.
- Investigate if the proposed documents can assist the system analyst and design team with which template elements are required by users, e.g., those who want help with the behavioural change process.

8.5 PHASES OF THE EVALUATION STUDY

There are three stages to the evaluation study:

- **Phase one:** Induction of, and familiarisation with, the supporting materials. The researcher shows the stakeholders the documents, answers questions, and clarifies misunderstandings.
- **Phase two:** This phase evaluates the design features configuration and the usefulness of the acceptance and rejection factors of the online peer group, without using the evaluation supporting materials.
- **Phase three:** an evaluation of the design configuration and acceptance and rejection factors of the online peer group, comprised of 2 steps:
 - Step 1: Production of the design configuration and usefulness of the acceptance and rejection factors of the online peer group, accompanied by supporting documents.
 - Step 2: Production of the design features configuration and the usefulness of the acceptance and rejection factors of the online peer group, accompanied by supporting documents and the recommendation and guidelines principles.

The phase two and three were comparative, as they had the same objectives. However, there are extra tools in phase 3 to help with the comparison analysis.

8.5.1.1 EVALUATION DOCUMENTS

The participants were provided with the following documents detailing information relating to the configuration process (see **Appendix 3**).

- **Document 1:** Introduction and familiarise the representative users with the problem.
- **Document 2:** Evaluation materials without the EVAFR documents.
- **Document 3:** Five templates for the acceptance factors of the online peer group.
- **Document 4:** Four templates for the rejection factors of the online peer group.
- **Document 5:** The configuration templates for the design features of the online peer group
- **Document 6 & 7:** The recommendation and guidelines to consider when configuring online peer group.

8.5.2 DESIGN ONLINE PEER GROUP WITHOUT EVAFAR MATERIALS

Phase 2 was focused on whether the participants can specify their acceptance and rejection factors and the design features of the online peer group, without the help from the EVAFAR materials. At this stage, the participants will be provided with a briefly introduction of the online peer group, scenarios and examples of available mobile applications for regulating users problematic digital usage. Participants had no prior knowledge of the EVAFAR material, i.e. what it is made of, how it works, or the supporting documents. Participants were invited to a session and asked to express their design features of the online peer group with the system analyst.

The aim of the session was described first. The system analyst is familiar with gathering the standard requirements and helps the representative users with the process. Users were divided into two groups to increase participation and increase the diversity of viewpoints. This lowered the chances of users influencing each other's points or dominating the discussion. The findings are shown in Table 28, 29 and 30.

8.5.3 CONFIGURATION OF THE ONLINE PEER GROUP WITH THE EVAFAR MATERIALS

This objective of this phase was to configure and design the online peer group with the help of the templates provided in the EVAFAR materials. This phase comprised of three central activities. First, the objective of this phase was to evaluate usefulness of the acceptance factors and negotiate the factors that participants selected then reach an agreement by going through the consensus decision making process. Second, to evaluate the usefulness of the rejections factors and negotiate the factors that participants selected then reach an agreement by going through the consensus decision making process.

Third, evaluate the configuration of the design features of online peer group and negotiate the factors that participants selected then reach an agreement by going through the consensus decision

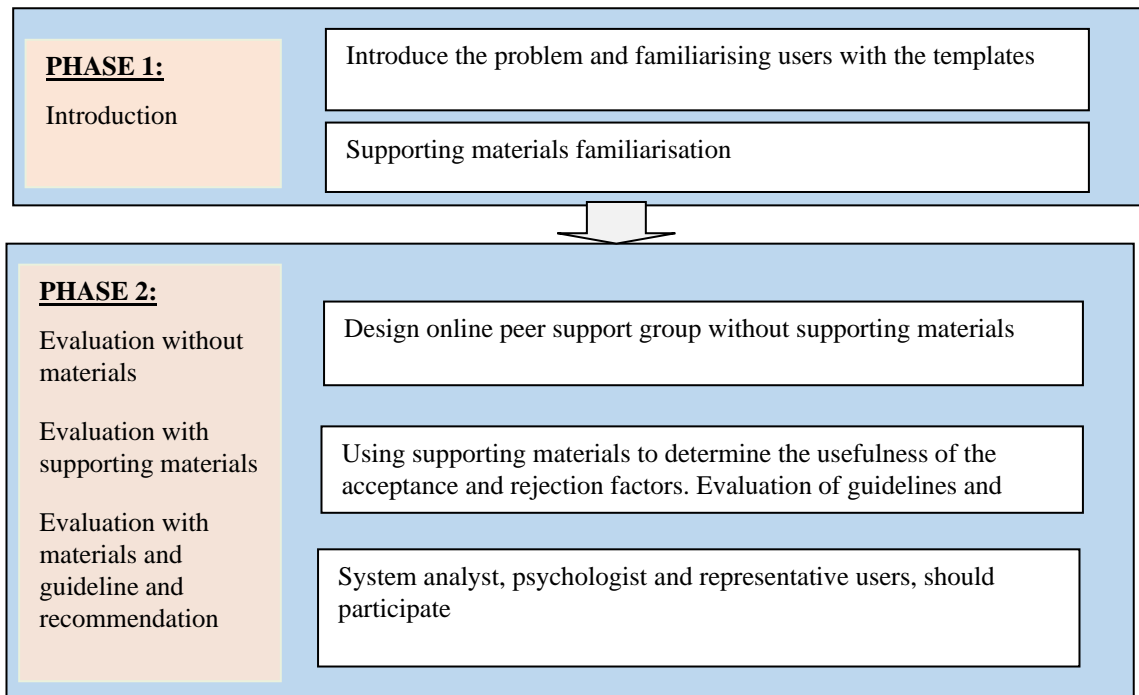


FIGURE 73 LAYOUT OF THE EVALUATION MATERIALS PHASES

making process. The system analyst was mainly involved in this activity, together with the representative users and a psychologist. Participants were given the Templates. Users specified their design preferences by following the elements on the templates. During the evaluation session, participants were given Instagram screenshots depicting features of the application and various interfaces. After the templates were completed, the information was analysed to ascertain the functionalities which need to be provided by the online peer group.

Evaluation of template usefulness was carried out in regard to the user i.e. their ease of use, if they can be understood and if the various components can be followed, and whether they would like to use the template. Additionally, information was gathered in regard to how they found the template filling process, e.g. did they struggle with the materials, and were there any other elements that they would like to see? The overall template length was also determined, as well as whether it was easy for the participants to agree on the design features.

8.5.4 EVALUATION STUDY QUESTIONS

The aim of the evaluation study is to determine if the EVAFAR materials satisfy the following questions.

Users' Questions:

- What are your thoughts about configuring online peer group design features and why?
- How does the proposed EVAFAR materials help you to configure online peer group design features?

- How much do the EVAFAR documents help you to express the online peer group design features?
- What challenges did you encounter when using the EVAFAR materials? Why?
- Do you have any recommendations to enhance the EVAFAR materials?

8.5.5 EVALUATION STUDY PROCESS

The evaluation was performed based on the following guidelines:

- A consent form was emailed to the participants prior to commencing the study, as well as a study information sheet outlining the study's purpose and what is expected of the participants.
- The participants were emailed all documents relating to the method of evaluation.
- Participants from different backgrounds and disciplines were recruited to ensure diversity.
- An induction was performed in regard to the nature of the evaluation session, supporting documents, expectations of completing the templates, and examples of how the template should be completed.
- The researcher assumed the role of 'a participant as an observer' to participate in the discussion and provide guidance to the participants.
- The participants were divided into **two** groups to maximise the time; each group had one system analyst, one psychologist, and representative users.
- At the start of the session supporting materials were provided so that participants could familiarise themselves with the study. The goal was to help participants understand the topic and stimulate their thinking.
- The study included three phases, as shown in Figure 73.
- Participants were first asked to read the proposed case study and discuss it with their group, they were given the chance to ask questions about the case study.
- The researcher observes participants and notes any key aspects. This helps to evaluate the strengths and weaknesses of the supporting documents.
- Participants were asked to participate in a group discussion to gain their opinions about the supporting documents, including their completeness, usefulness, and efficiency.

8.5.6 EVALUATION STUDY PARTICIPANTS' SELECTION

It is recommended that a specific set of stakeholders participate, they would be those who could play various roles in the elicitation process. The analysts and design team are expected to use the EVAFAR materials; these teams are comprised of 3 primary stakeholder types: i) designers with a good understanding of social software, software development, HCI, and user involvement; ii) a

practitioner with a relevant psychological background; iii) end-users of the customised online platforms. The role of the system analyst is to help the participants during the configuration process. Table 29 illustrates the selected sample's characteristics. The ethical documents are in **Part A and B, Appendix 1**.

Users were included based on (i) representative users with experience and expertise in using social network applications, and (ii) self-declaring to have problematic social network usage and willingness to get help. The remaining participants were recruited based on their expertise in the area, and related areas. The evaluation study therefore uses convenience sampling.

TABLE 29: PHASE 3 PARTICIPANTS

Participants	Academic background	Age Group	Gender	Nationality
P1	Computer forensics	35-40	Female	Saudi
P2	MSc student in Business	30-34	Female	Pakistani
P3	Accounting	25-30	Male	Indian
P4	MSc Student in Computing	30-34	Male	Saudi
P5	BSc Student in Psychology	18-24	Female	British
P6	Computing	30-34	Male	Saudi
P7	Computing and Social Informatics	30-34	Male	Iraqi
P8	Media and Communication	30-34	Female	Moroccan
P9	Cyber security	35-40	Female	Saudi Arabia
P10	International Business	30-34	Female	Egyptian
P11	BSc in law	18-24	Male	British
P12	MSc Student in Law	25-30	Male	Algerian
P13	PhD in Inorganic Chemistry	35-40	Male	Pakistani
P14	Information System	18-24	Female	Saudi Arabia
P15	Psychology	30-34	Female	Turkish
P15	BSc in Psychology	18-24	Male	British
P17	Computing and Social Informatics	25-30	Female	Algerian
P18	Media and Communication		Male	Egyptian
P19	MSc Student in Marketing	30-34	Male	Iraqi
P20	PhD Student in Computing	35-40	Male	Pakistani
P21	PhD student in International Business	30-34	Female	Pakistani
P22	MSc student in Law	18-24	Female	India

8.5.7 DATA GATHERING AND ANALYSIS TECHNIQUES

To help achieve the aims of the study, qualitative data collection methods comprising interviews and focus groups were used, as follows:

Focus Group: Representative users were then invited to focus group sessions. Three of these sessions were carried out with 22 multi-disciplinary participants. In the first session eight participants took part, seven in the second, and seven in the third. Participants were informed of the evaluation context and its supporting documents. The analyst and design team used questions on the elicitation templates to guide the attention of participants toward the acceptance and rejection factors of the online peer group and the design elements. After specifying their acceptance and rejection factors and the design requirements, the group discussed how they found the elicitation process, i.e. the templates and the supporting materials.

Interviews: Opinions on the templates and the supporting documents were gathered by using interviews. The researcher follows a semi-structured interview style and used follow-up questions to clarify the experts' statements. Before starting the interviews, the researcher described the interview objectives and made sure that all ethical processes were adhered to. Permission was gained before conversations were recorded.

Interview and Focus Group Analysis: After the focus groups and interviews were conducted, the audio recordings are transcribed verbatim, this helps the analyst familiarise themselves with the interview data. The analyst should consider coding sentences which have specific relevance to the template elements and other documents. The codes could reference aspects such as the situation which triggers a particular usage, their emotional and psychological state during the usage, and other unexpected elements which could help with the behavioural change process.

8.6 METHOD EVALUATION: CASE STUDY

The evaluation study used Instagram as a case study. Media platform and social networking service and was developed to help people communicate, connect, and relax. Instagram allows users to share information, i.e. Messages, pictures and videos, and share their status with their friends. The application also provides features allowing people to comment and like other people's posts. Using Instagram can be problematic for some people, and this usage is traceable, progress can tractable, and interventions can be designed to occur in real-time. We assume that Instagram's developers, as well as third party developers, would like to add an additional layer to enable online peer support group features to augment their digital media platform. This new layer will help those people with a problematic usage style to manage and control their usage. The online peer group procedure could also be done using Instagram. Moreover, digital space allows an online peer group to monitoring usage, provide real-time interactivity, encourage transparency to users about the information used to formulate the intervention and the content and enforcement of deviation countermeasures.

The application development team want to know if they can design the online peer support and how the design would look and function. This research focuses on assisting the analyst and design

team to assemble various acceptance factors to motivate users to join the group, as well as accumulating the online peer group design requirements to help address problematic usage and allow the new layer's design to provide facilities for setting and enforcing the group. The evaluation documents can assist the analyst with carrying out user studies and establishing who it is that is using the application, their requirements, and their functionalities for the new layer. Participants were provided with various Instagram interface screenshots depicting different features/interfaces of the application.

8.7 EVALUATION STUDY: RESULTS

This section will discuss the findings of the evaluation study. The results will be discussed in line with the proposed objectives of the evaluation, i.e., first, evaluate the design configuration process with supporting materials. The second, effectiveness of the supporting materials to assist in the design configuration process and third, the effectiveness of the supporting documents guidelines in successfully aiding this process.

In all the evaluation steps, the system analyst should guide the representative users following the design steps, such as the negotiation process steps and instructions on how to reach an agreement in relation to the factors that would increase the user's acceptance and rejections and the design configuration for the online peer group.

8.7.1 RESULTS WITHOUT THE EVAFAR DOCUMENTS

This phase was conducted without the support of the supporting material documents. The task of the study participants included providing their online peer group design features and the acceptance and rejection factors for the online peer support group. The findings are shown in Tables 28, 29 and 30.

This process was carried out without using the thesis findings or other documentation. The researcher began the activity by describing the expectations of the study participants. The study participants' task included assisting in the elicitation of their preference in relation to the acceptance, rejection factors and the design features of the online peer group as well as agreeing on the final outcome at the end of the activity. During the evaluation session, the communication between the study participants and the facilitator of the session was observed. The study participants also provided feedback and comment on different aspects of the process by answering questions. The findings of the study raised some questions about the objectives set out in this phase. The following bullet points present examples of these concerns:

- The length of time the study participants spent time making decisions in relation to their preferences was clearly evident during this phase of the evaluation session. The study participants found it difficult to quickly express their acceptance and rejection factors. It

was clear that this was the case when the facilitator instructed the study participants to finish the first task and move to the next task while some participants were still working on the first task.

- The majority of the study participants were not very familiar with the elements of the evaluation, for example, they have limited knowledge of some of the main acceptance and rejection factors and in particular their sub-factors which was brought up during the group discussion at the end of the evaluation session. Some components, for example, educational tools, i.e. peer learning and the moderator role, were partially considered while others were not.
- The study participants agreed that the evaluation process without adopting a specific approach, i.e. without the EVAFAR materials and other documents was difficult “*it was hard for me to specify my preferences*”. As a result of the lack of structure and supporting materials, the study participants were providing generic acceptance and rejection factors. When asked if they thought the process would be easier if they were given materials to direct and help them, they unanimously answered yes.
- All of the participants struggle to expand on their specified acceptance and rejection factors and variability feature. In relation to these factors, for example, the study participants expressed some preferences but did not elaborate on the reason for their preferences.
- The participants had difficulty to identify and determine the rejection factors. During the session, the designer tried to provide an example to make the participants understand the acceptance and the features of the online peer group design.
- The participants agreed that some of the acceptance factors are conflicting with the rejection factors, for example, they agreed “penalty is useful in the group such as reduce points that would help users to be aware of the goals progress” but at the same time they reject the group to have reward, such as points and badges.
- The participants preferred the group to be designed as a learning and motivational tool and the group should provide video and invite ex-addict to tell story, at the same time, they reject the group moderator to compare goals progress with other members.
- The participants reject the group to have a routine and have same strategies of learning they agreed the group should follow different strategies of learning after a period of time.
- The participants rejected a weak moderator and group moderator should make sure the group members do not go out of the topics.
- The participants found it difficult to reach an agreement during the discussion and the designer end the discussion through voting.
- The participants did not find it easy to reach agreement and the discussion took very long.

TABLE 30: SAMPLE RESPONSE OF THE FIRST FOCUS GROUP SESSION

Online peer group acceptance factors	
Main acceptance factors	Participants preferred features and reasons
Entertainment	The participants rejected the group introduce as entertainment tools, a participant mentioned “ <i>I do not prefer play games and the group should not be designed like a game</i> “ The participants accept the group to have reward and penalty.
Education	The participants found video materials and storytelling by ex-addict useful
Support tools	It will be useful for the group to get support from the moderator.
Awareness tools	The participants do not mention any thing about awareness
Prevention tools	The participants said that the moderator would help by sending feedback to help prevent the overuse

TABLE 31: SAMPLE RESPONSE OF THE FIRST FOCUS GROUP SESSION ABOUT REJECTION FACTORS

Online peer group rejection factors	
Rejection factors	Participants preferred features and reasons
Weak Moderator	The participants agreed that a weak moderator is not acceptable in the group and the moderator should make sure the discussions between members should not be out of the group aims.
Reject the group follow routine style and the same strategies	The participants agreed the group should always follow a new strategies and motivation, they do not accept the group to follow the same routine.
Reject to compare their usage and achievement with other group members	The participants agreed on rejecting comparing usage with other members.
Reject rewards	The participants reject the group to have rewards and they mentioned “reward will not motivate them to control their digital media usage”

TABLE 32: SAMPLE RESPONSE OF THE FIRST FOCUS GROUP SESSION THE DESIGN FEATURES

Online peer group the variability design features.	
Design features	Participants preferred features and reasons
Monitor system	The participants agreed the system should monitor the digital media usage
Moderator nature	The participants agreed the moderator should be intelligent and human
Setting goals	The participants agree that the goals should be set collectively between group members and moderator should approve it.

Feedback	The participants just accept to receive feedback from intelligent moderator.
Comparison	The participants do not accept to be compared with other group members.
Moderator feedback	The participants agreed that the moderator should provide guidance and advisable feedback.
Exit procedure	The participants agreed that there should be some conditions to leave the group, for example, a member should achieve certain goals before he/she can leave the group <i>“it should be like a puzzle and to leave the group you should solve the puzzle first, i.e. by achieving some goals progress”</i> .
Moderator skills	The participants agreed that the moderator should be a therapist.
Privacy	The participants agreed that they prefer to have privacy on their usage and profile information.
Membership	The participants agreed that they prefer the group members to be strangers.
Reinforcement function	The participants agreed that they prefer to reduce points from members who do not achieve progress. The participants agreed that they prefer the moderator to ban members who disrupt other members.

8.7.2 RESULTS WITH ACCEPTANCE AND REJECTION FACTORS

This part involves evaluating the usefulness of the acceptance and rejection factors of online peer group presented in Chapter 4 of the thesis. In the first part, acceptance factors of online peer group are gathered from study participants. **Templates ID 1 and 2** were used here. An explanation for the five main acceptance factors is provided in (**Document 3, Appendix 3**), this would help participants when selecting the acceptance features for the online platform. Gathering potential users acceptance factors is a key step towards the design of the online platform because failure to be equipped with this knowledge could lead to designing a system that is not usable or not accepted by its intended users. For Document 3 and the templates, see Appendix 3.

The system analyst was in charge of leading the evaluation session discussion, as well as guiding and assisting users in defining their acceptance factors preferences for the online peer group. As previously stated, the evaluation study's aim is to assess the usefulness of the EVAFAR templates in helping participants express their acceptance factors for the peer group. As a result, rather than verifying acceptance factors the participants defined, the researcher's primary responsibility was to observe how the materials helped them expressed their acceptance requirements. The results of this evaluation study are summarised below.

- The participants who acted as representative users in the evaluation study accepted that the templates provided for each family of acceptance factors and the explanation provided for each factor help them know the various aspect involve in each category and think

about which of the factors would make them accept online peer group and therefore might assist them control their problematic Instagram use.

- The study participants agreed with the main acceptance factors and all the elements related to each factor. They study participants stressed that separating the factors on various templates helped focus them on one factor at a time and prevent confusion between the various factors, for example, the entertainment mechanisms, awareness tools and educational tools.
- Although the templates helped guide and focus study participants on what is relevant regarding the acceptance factors of online peer group, the study participants emphasised that providing some examples on each template would stimulate their thinking when responding to the questions, for example, when writing the reasons for their preferred acceptance factors.
- The participatory design technique employed when using the materials helps the usefulness of the material in supporting the requirement gathering process. Direct involvement of representative users improved coordination between the system analyst and the study participants, ensuring that they properly defined their configuration preferences for the online peer group.

TABLE 33: SAMPLE RESPONSE OF THE SECOND FOCUS GROUP SESSION ACCEPTANCE FACTORS

Suggested online peer group acceptance factors		
Main Acceptance factors	Sub-acceptance factors	The features that the participants agree on during the discussion
Entertainment mechanism	Award as entertainment	<p>Awards – I want to receive an award, i.e. points when I achieved my goals because this will motivate me to work hard towards achieving the goals or future goals.</p> <p>Gamification mechanism – I want the online peer group to provide a leader board and list group members on the leader board according to goal performance. Seeing my name on top of the board would motivate me to continue to work and attain my goal or if I am underperforming, this would motivate me to work harder towards achieving my goal and move up the leader board.</p> <p>Awards – I want the system to give me a badge when I am progressing well towards my goals.</p> <p>Gamification mechanism – I want an award in the form of a progress bar, so</p>

		<p>that I can see the colour of the bar increasing and this would motivate me to work harder towards achieving my goal/s.</p> <p>Penalty – I want to be penalised when I fail to achieve my goals by reducing the point earned from achieving other goals or staying within the expected usage level.</p> <p>Penalty – I want to be penalised by reducing my levels as seeing my levels gradually reduce, would make me commit more to my set targets.</p>
	Peer comparison as entertainment	<p>Peer comparison – I would like to be with others people in the group so that I become aware of my goal performance in relation to others, if I am performing below my peers then I will work to improve my performance, but I don't any members can know who I am</p> <p>I want to be compared with peers who have similar problem, because if I see them achieving their goals then I would work hard to reduce usage as well.</p> <p>Comparison in relation to the whole group because this would motivate me to continue to pursuit my goals.</p> <p>I want to be compared with peers who have similar problem because this would help me assess where I stand in comparison to the other members.</p> <p>I want to be compared with peers but I prefer my peers not to see my details in relation to my problem.</p> <p>Peer comparison to be competitive among group members as this competition element would help enhance my commitment and motivation towards my targets.</p> <p>I want to be compared with peers who have similar problem, I will be more comfortable because I know that they would not judge me.</p> <p>Peer comparison, based on group goals and targets, because this information would help me adjust my behaviour if I am underperforming as I do not want the</p>

	<p>Goal achievement as entertainment</p>	<p>group to fail as a result of my performance.</p> <p>I want to set goals that I am able to achieve because if the goals are difficult to achieve then I will just give up.</p> <p>I just want my achievement to be recognised, i.e. I want to be rewarded when I achieved my goals or when the group goals are achieved.</p> <p>I want to set a main goal and have various sub-goals that would help me achieve the main goal because this would improve my motivation.</p> <p>I want to be able to set up my own goals because I know my ability and will therefore set the goals in accordance to my ability.</p> <p>I want the group to have a monitoring system that would aid members goal attainment. The monitoring system would help me trust provided goal performance information.</p>
<p>Awareness tools</p>	<p>Self-awareness</p>	<p>Self-monitoring – I want to self-monitor my daily usage of various digital media applications because I do not want others to know my usage especially in the early stages.</p> <p>I want the group moderator to provide a weekly report of my usage and goal performance because I trust the moderator to provide such information.</p> <p>I want the group moderator to provide feedback on my digital media usage because I think the moderator would consider my feelings when writing the feedback messages.</p> <p>I want to be provided pop-up warning feedback to help raise my awareness of my digital media usage. The pop-up warning would help show my usage while the behaviour is happening.</p> <p>I want automated report because the software does not know me and would provide honest feedback regarding my usage and this would help raise my awareness of my usage and level of addiction.</p>

		<p>I want the group moderator to provide weekly report on my digital media usage to help me reflect on my behaviour and usage time.</p> <p>I want self-monitoring because I want to be able to compare my present and past usage time and adjust my behaviour where necessary.</p> <p>I want the feedback about my digital media usage to come from the group moderator because I do not want other group members to see my usage.</p> <p>Automated report – I want the software to provide me a report each week showing my usage of digital media for that week because this would help me evaluate and be aware of my performance for the whole week.</p>
	Peer comparison as an entertainment	<p>Peer comparison – comparing my digital media usage with other peers would help improve my awareness of my usage.</p> <p>Peer comparison – I want to be compared with peers who are in the same course as me because this will help me be aware of my usage especially if it is affecting my study time or coursework.</p> <p>I want peer comparison with others who have the same hobby or do similar things as this will help me to be aware of my usage better. It will also help us plan offline activities.</p> <p>I want my goal progress to be compared with peers who are in a similar problem because if I know that some of my peers are having a better progress then this would motivate me to work hard and be in the same level.</p> <p>Peer comparison because knowing that my peers are doing well, would make me want to be like them and this will be a form of motivation for me to improve my performance.</p>
	Achievement goals	<p>I want to set my goals but were this become challenging, raising my awareness on other ways to set the goals and how to achieve the goals would be helpful.</p>

		<p>I want the system to notify me when my usage time increases continuously for a week because knowing that it is coming from the system will motivate me more.</p>
Educational tools	Peer learning	<p>If I am failing to achieve my goals, I want the platform to help me learn how to achieve my goals from my peers who manage to achieve their goals.</p> <p>I want the system to provide the ability for users to share how they manage to reduce their digital media usage with other peers because this will help people like me to learn from such information.</p> <p>I want my peers to provide emotional support when I am failing to achieve or make progress towards my goals.</p> <p>I want the system to provide the ability for my peers to support me through the goal achievement process because if I am not following my goals, my peers can advise me to stay on track with my goals.</p>
	Moderator role	<p>I want the moderator to help me learn how to reduce my problematic digital media usage because I believe that they know what they are doing.</p> <p>I want to learn from an experienced moderator because they know that they are doing and this would make me want to learn from them.</p> <p>The moderator, because I think the moderator would provide a plan tailor to my own behavioural change needs.</p> <p>I want an experienced moderator to help learn how to control my usage because I know the moderator would provide the right guidance to help me change my problematic usage of digital media.</p> <p>I want to learn from the moderator so that I can help other peers to achieve or continue to progress well towards their goals.</p> <p>I want to learn from an experience moderator some leadership skills so that I will be able to help my peers set up goals and plans to achieve the goals.</p>

	Set up goals	<p>I want the system to guide and support me through the process of setting my goals, for example, how to achieve the goals.</p> <p>I want other group members to support me through the goal setting process because this way, if I am not sure what goals to set, they can assist me through the process.</p>
Prevention tools	Moderator feedback	<p>I want the moderator of the group to provide feedback on how I am performing with respect to the goals I set.</p> <p>I want the feedback to be provided by the system because I know the system would not be biased when providing the feedback.</p>
	Peer feedback	<p>I want the feedback to be sent by my peers in the group and I want them to consider my feelings when writing the feedback messages.</p> <p>I want to receive friendly feedback messages from peers in the group especially when my goal performance reduces.</p>
Support tools	Provide an advice	<p>I want the system to have the ability to monitor my digital media activities and send me message on my usage time.</p> <p>I will be motivated to reduce my digital media usage if the feedback from peer who care about me.</p>
	Feedback	<p>I want the online platform to motivate and encourage me to continue pursuing my goals regardless of my goal performance.</p> <p>I want the system to prevent my peers from negatively commenting on my goal performance.</p>

This second activity's primary purpose was to gather participants preferences for the rejection factors of the online peer group. The study participants preferences in relation to the main rejection factors, i.e., intimidation tools, overly judgemental and unmanaged interactions and unclear membership and sub-factors were gathered in this stage of the evaluation process. In addition to the Templates ID 2, the supporting material presented in Document4 (in Appendix 3) to be used by study participants. The goal was to educate study participants about the different factors to consider in order to stimulate thinking.

The study participants were instructed to state their preferences in relation to the various rejection factors. Participants were also asked to provide reason for their choice, i.e., why they would reject their selected factors in the online peer group. The results of this activity resulted in a template that represented the study participants rejection factors displays in Table 32. The following bullet points provide an outline of the results.

- The study participants stressed that categorising the main rejection factors and their sub-factors on various templates was extremely helpful because it gave them a clear path to follow. They were able to define their preference for all the rejection factors in this way, which stopped them from missing or ignoring any factor. In addition, some participants indicated that the format allowed them to avoid expressing generic requirements that would not cover all the factors that would make them reject online peer group.
- Although most of the study participants appreciated the explanation for sub-factors, study participant recommended adding explanation for the main rejection factors on each template or provide such information on a separate document as this would help further enhance their understanding of the factors.
- Some of the participants stated that the researcher could provide more tick boxes on the templates for the factors and some examples of reason for choice for the study participants to tick what applies to them.
- The selection of the rejection factors was easy for some of the study participants. They stated their preferences for different aspects of the main rejection factors, and also managed to state reason for their choice for each of the stated rejection factor. Throughout the evaluation study, the researcher ensured that adequate explanation was provided where it was required, which assisted some participants in completing this part of the evaluation.
- After the activity was finished, the study participants together with the researcher had a discussion about the outcome of the activity to ensure that everyone was pleased with the final outcome of the activity. Despite the fact that some participants admitted that they found it a bit challenging following the procedure at beginning, they reported that they had been directed and guided carefully through the steps of process.

TABLE 34: SAMPLE RESPONSE OF THE SECOND FOCUS GROUP SESSION REJECTION FACTORS

Suggested online peer group rejection factors		
Main rejection factors	Sub-rejection factors	The features that the participants agree on during the discussion
Intimidation tools	Harsh Penalty	Harsh penalty would make me reject online peer group especially if it involves writing my name on the platform where all group members can see it, this would

		make me uncomfortable and as a result I would prefer to leave or not join the group.
		I do not like harsh penalty, for example, blocking me from the group because this would demotivate me from the group and reduce my commitment towards achieving my goals.
		I do not like harsh penalty because this would me feel that the online platform is trying to force me/threaten me and this would demotivate from actively participating in the group.
		I do not like harsh penalty because this would discourage me from participating or joining the online platform.
		I do not like harsh penalty because I will be worried about what other group members would think of me and this would affect my feelings and emotions.
		I do not like harsh penalty because I think providing such penalty without considering or knowing the reason/s why I am failing to achieve my goals is unfair to me.
		I do not like harsh penalty, for example, blocking me from the platform because this would make me feel that I am not given a choice or the help I need to achieve my goals is not provided.
		I do not like harsh penalty, for example, writing my name on the platform because this would make me feel bad among other group members.
		I do not like harsh penalty because I might be wrongly judge by other group members. I would be more concern about what others think of me than achieving my goal.
	Negative feedback	I do not like negative feedback because this makes me feel that my emotion is not taking into consideration while framing the feedback messages.
		I do not like negative feedback; I prefer it to be critical, encouraging and constructive as this would make me feel that my feelings are considered while framing the feedback.

		<p>I do not like negative feedback because this would make me feel embarrass especially if other group members can access and see the feedback messages.</p> <p>I do not like negative feedback because this would make me feel bad about myself.</p> <p>I do not like negative feedback because the negative messages would not work well with me and I will feel that the platform is not taking my wellbeing into consideration.</p> <p>I do not like negative feedback because this could have other negative consequences, e.g. reduce motivation and commitment to the group goals.</p>
	Harsh feedback	<p>I do not like harsh feedback because I could be wrongly accused by my peers, so the platform should understand the reason for my behaviour before issuing such feedback.</p> <p>I do not like harsh feedback because some people in the group might not like me and therefore may be unfair to me.</p> <p>I do not like harsh feedback because I feel that the platform should provide a warning first because delivering harsh feedback.</p>
Overly judgemental	Overly judgemental by moderator	<p>Because this would make me feel that the moderator is just there to pick on me instead of helping me manage my problem usage.</p> <p>Because the moderator's job is to help me achieve my goals by providing useful information not to be constantly judging me.</p> <p>Because I think the moderator should understand why I am not performing well before issuing judgemental messages.</p> <p>Because I prefer the moderator to help me with a plan to achieve my goals and not judge me.</p>
	Judgement by only online contacts	<p>I do not want to be judge by peers who are only online contacts because I feel that these people cannot judge me fairly as they do not know my other real-life activities.</p>

		I do not want to be judge by peers who are only online contacts because I feel they would not care about my feelings and emotions.
		I do not want to be judge by peers who are only online contacts because I feel they would not consider the reason for my social media interactions before judging my usage style.
		I do not want to be judge by peers who are only online contacts because they would think that they can get away with anything since we do not have any real-life interactions.
	Judgement by real-life contacts	I do not want to be judge by peers who are real-life contacts because I think that my online peers would talk about me to our friends who are not part of the group.
		I do not want to be judge by peers who are real-life contacts because I feel that there is no secret and even those who are not supposed to know about my problem usage and unsatisfactory goal performance would find out.
		I do not want to be judge by peers who are real-life contacts because I feel this could demotivate me from the group.
		I do mind if I judge by peers because jude by peer would motivate me to be change
Unmanaged interactions and unclear membership	Weak moderator	I do not want a group with a weak moderator because a weak moderator would not be able to manage the group and members could behave any how they want.
		I do not want a group with a weak moderator because I think if the moderator is weak then he/she could favour those who are vocal in the group.
		I do not want a group with a weak moderator because a weak moderator could be unfair to some group members.
		I do not want a group with a weak moderator because he/she might be scared about members reactions when they issue feedback or warning messages and would therefore prefer not to provide any

		<p>which could affect the group's performance.</p> <p>I do not want a group with a weak moderator because I think he/she could be control by some group members.</p> <p>I do not want a group with a weak moderator because if the moderator is weak, then some group members might feel that they can do anything without consequences.</p>
	Large group size	<p>A large group could lead to some members forming smaller groups which could affect members working together in one group to achieve the group goal.</p> <p>A large group could make committing to the group goals difficult.</p> <p>The moderator could find it difficult to manage a large group especially if the group has a weak moderator.</p> <p>If the online peer group is large in size, then providing guidance and advice could be challenging because the members may have diverse need and ability for achieving the group goals.</p>
	Group members unknowing people	<p>Because I do not want some members, e.g. unknown members to know my personal details or be able to identify me.</p> <p>Because I am concern about my privacy so I do not want others members to have this information.</p>
		<p>I do not like conditions to exit a group because this will make me feel trap in the group if I do not meet the conditions to leave the group.</p> <p>I do not like conditions to exit a group because I will feel that my freedom is seize and this will make me reject the online group.</p> <p>I do not like conditions to exit a group because I think I should have the choice to leave without taking permission from anyone, e.g. the group moderator or other group members.</p>

8.7.3 RESULTS OF EVAVAR WITH SUPPORT OF DESIGN FEATURES

This is the third activity in the evaluation of the design configuration process. This activity's main purpose was to gather variability features of the online peer group. The study participants preferences in relation to the main features, e.g., moderator, moderator task, goal setting, feedback and comparison, exit procedure and privacy were gathered in this stage of the evaluation process. In addition to the **Templates ID3 to ID8** (in **Appendix 3**) the supporting material presented in **Document 5** (in **Appendix 3**) was used by study participants. The goal was to educate study participants about the different factors to consider helping stimulate thinking.

The study participants were instructed to state their preferences in relation to the various variability features. Participants were also asked to provide reason for their preference, i.e., why they would like to have their selected features in the online peer group. The results of this activity resulted in a template that represented the study participants variability design features (displays in Table 35). The following bullet points present an outline of the findings.

- The participants agreed that categorising the various variability features, moderator, moderator task, goal setting, feedback and comparison, exit procedure and privacy enabled the participants to express their requirements for all elements of the variability features and also prevent the participants from avoiding some elements.
- The design configuration of the variability features, such as the reinforcement function, was easy to follow by the participants. The participants stated their preferences about the various aspects of the feature and presented more information for each of the specified reinforcement function. The participants' and system analyst very much like the examples presented on the templates and agreed that these are essential in helping them successfully specified their preferred reinforcement function "*the examples were useful and assist me specify my prefer features*". The researcher ensured that adequate clarification was given where required during the evaluation study, which aided some participants in completing this task.
- In some features the participants took a long time to reach an agreement and for some of the features they do not agree because of the privacy, such as rota-moderator, as they are concern about access to their profile information and feedback as well as moderator's ability to ban members.
- Some of the participants stated that there is a lot of templates to complete in the evaluation study and completing them can be a difficult task for them and can cause them to lose interest. As a result, it was suggested that the system analyst run different focus groups and specify the templates to complete in each focus group.

TABLE 35 SAMPLE RESPONSE OF THE SECOND FOCUS GROUP SESSION DESIGNE FEATURES

The features that the participants agreed on during the discussion	Proximity of goals that participants agreed on	Source of goals the participants agreed on	Reason for your choice
I want to prevent checking Facebook when working on my research.	Distal goal	Self-set	This would give the users more time to focus and meet their research deadline.
I want the system to remind me to avoid using Instagram when I out and about.	Distal goals	Group set	users want to be able to interact in person with their friends and family.
My friends and I want to stop using Instagram for three hours when working on our assignments.	Proximal goals	Group set	the participants want to avoid any virtual interaction and focus on our work.
I want to reduce the frequency of checking Instagram during weekdays.	Distal goals	Guided goals	users want to spend time with their children.
My friends and I want to be reminded to stop using Instagram after 2 hours of usage.	Proximal goals	Group set	This would give users time to socialise offline.
I want to reduce the number of times I check Instagram.	Distal goals	Assigned goals	users feel that they check Instagram too much and this is taking time from their daily task.
I want to reduce the frequency of checking Instagram when we are having family time.	Distal	Guided goals	Users feel that they are not spending time with their family which might affect their relationship in the future.
I want to prevent using Instagram for 3 hours when I am together with my friends.	Proximal goals	Group goals	This will give users the time to go out for a walk or watch a movie with their family without any distraction.
My family and I want to use Instagram for 1 hour in the evening.	Proximal goals	Group set	This will help users to use the rest of the evening for family time.

I want to limit the time I spend commenting on Instagram.	Distal goals	Self-set goals	This is because users waste a lot of time commenting on various posts so they want to reduce this time.
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TABLE 36: SAMPLE RESPONSE OF THE SECOND FOCUS GROUP SESSION DESIGNE MODERATOR FEATURES

Element	The Monitoring features the participants agreed on	Provide examples of when to apply the participants preference
Monitoring	Peer-monitoring	<p>I prefer peer monitoring, for example, I want to be compared with my study group regarding posts and comments we made on Instagram.</p> <p>I want to be monitored with my friends in relation to the videos and number of pictures we post on Instagram.</p> <p>I want to be monitored with my friends regarding the number of likes we made on Instagram posts.</p>
	Self-monitoring	<p>I want to be self-monitored in relation to my Instagram usage especially in the early stages of the recovery process because I do not want others to know my Instagram use.</p> <p>I prefer to self-monitor my usage regarding the time I spend on Instagram.</p> <p>I want to self-monitor my usage in relation to the number of times I check Instagram.</p>
	Automated monitoring	<p>I prefer the system to monitor me and send reminders when I have other tasks to focus on.</p> <p>I want the system to monitor me since I might be busy and could forget to conduct the monitoring.</p> <p>I prefer the new application to monitor my goal progress and</p>

		ban me from Instagram after I past my set goal by 30 minutes.
Privacy	My profile data	<p>I want my profile information to be private, <i>“my sensitive information reveal on my profile should not be available to group members, they should only see my profile name”</i>.</p> <p>I am now concern when other members have access to my provide information, especially when group members are my close friends. The participants agreed the group should have privacy for their profile information and data and they recommended the group should used username and avatar pictures so no one can identify them.</p>
	Feedback I received, e.g. from moderator, software, peers	<p>If my goal performance is low, then I want the feedback to be from the software or moderator because <i>“I think the software and the moderator will not judge me for performing low”</i>.</p> <p>When I am progressing well towards my goals then the group members can provide the feedback. They agreed about the peer feedback should be provided when they achieved progress towards the goals.</p>

TABLE 37: SAMPLE RESPONSE OF THE SECOND FOCUS GROUP SESSION COMPARSION AND EXIT PROCEDURES FEATURES FACTORS

Element	The comparison features the participants agreed on preference	Provide examples of when to apply the participants preference
Comparison	Social comparison	<p>I want to be compared with members who have similar usage profile, students, or work colleagues.</p> <p>I prefer to be compared with members who want to limit their use of the profile update feature.</p>

		<p>I want to be compared with group members who have a similar level of problem.</p> <p>I prefer to be compared with other group members so that I know my progress compare to the group members.</p>
	Self-comparison	<p>I prefer my performance progress to be compared with my self-past performance at the start of the behaviour change.</p> <p>I want self-comparison concerning my Instagram usage time.</p> <p>I want self-comparison when I self-set my behaviour change goals.</p> <p>After I self-set my goals, I want my goal progress to be compared with my last week's performance so that I can assess if my usage is reducing.</p>
Exit procedure - Conditions and criteria of leave the group	<p>Members should declare in advance if they want to exit the group so others become prepared.</p> <p>Members who violate the group norms and mission should be forced to exit the group</p>	<p>When there is a member who is supportive to other members, if this member wants to exit then informing other members would be significant because having this knowledge in advance would help prepare me mentally. Also, this will help the members and moderator to discuss the next steps to take.</p> <p>When I am trying and working to progress well towards my goal then if someone in the group is distracting me from this goal then they show be force to exit the group.</p>
Exit procedure - when a group member is not achieving all his/her targets, who should decide if a member can leave the group	<p>The members themselves</p> <p>The moderator</p>	<p>Group members should be able to decide if members should leave the group when there is someone who is preventing the group from achieving the group goals.</p> <p>The moderator should have the ability to decide if a member should exit the group based on their goal performance when they believe that a member is</p>

		affecting others progress continuously.
Exit procedure - who can decide if the member should exit the group when he/she violates the group rules and mission?	The moderator The software based on data and reports about performance and group interaction	If there is a member who is constantly distracting other members or a member who sends negative feedback to others then the moderator should track and remove them from the group. When there is a member who is performing badly towards the goal and is not prepare to pursuit and achieve their goal, then the software should track and remove this member.

TABLE 38: SAMPLE RESPONSE OF THE SECOND FOCUS GROUP SESSION FEEDBACK FEATURES RESPONSES

The behavioural goal feedback features that the participants agreed on during the discussion
Feedback source agreed on
Group moderator Peer members Software Group moderator Software Peer members
Feedback framing and tone agreed on
they prefer positive feedback messages. they do not want the feedback messages to be harsh because this would discourage me from accessing the messages. They want the feedback messages to be neutral so that I can trust them. They want the feedback to be framed to make me feel disappointed about my usage. They want feedback messages to use encouraging tone to help me continue pursuing my goals. They want friendly feedback messages regarding my goal progress. They want negative messages about my goal performance progress. They want the feedback messages to provide factual information about my usage and possible consequences.
Feedback timing agreed on

They want the feedback twice a day.

They want the feedback to be presented after the behaviour because this would help me think about the time spend online.

They think after the behaviour would be useful because it would help me do better towards my goals.

They want the feedback during the behaviour.

They want the feedback after the behaviour.

They want to be given the chance to query the software regarding my performance feedback.

They want weekly feedback report.

They only want the messages once daily.

They want the messages twice a week, e.g. one at the middle of the week and one at the end.

Communicating methods of the feedback agreed on

They want to receive my feedback on one-to-one chat with the moderator because I do not want other members to be aware of my progress especially when my performance is below expectation.

They want my feedback to be provided in a forum and group chat when I become more confident and progressing well towards my goals.

They want my feedback to be provided through text when I am unable to listen to audio message, e.g. when I am in a lecture or meeting.

They want audio feedback when I am not doing well because the moderator can provide more detail about my progress and motivate me to continue to work towards my goals.

They want text reports detailing about my performance to be provided at the end of the week or end of the month because this would help me properly assess my overall performance.

8.7.4 RESULT OF EVAVAR WITH THE MATERIALS AND GUIDELINES

This is the third activity in the configuration of the design features of the online peer group. The final step in the evaluation involves configuring the design features of the online peer group. This activity's main purpose was to gather participants preferences for the configuration design features of the online peer group. Here, the participants were provided with templates depicting the online peer group design features and guidelines document. Also, the system analyst should guide the representative users following the design steps, such as the negotiation process steps and instructions on how to reach an agreement in relation to the factors that would increase the users acceptance and rejections and the design configuration for the online peer group. The participants were task to select their configuration design features and conduct a discussion in order to reach an agreement concerning their selected configuration design features of the online peer group following the consensus decision-making process. The study participants agreed preferences in relation to the main acceptance and rejection features and configuration features, i.e. moderator

features, goal setting, feedback features, reinforcement functions, membership criteria, etc. and sub-factors were gathered in this phase of the evaluation process. In addition to the **Templates ID1 to ID8** , the guidelines and recommendation in **Document 6 and 7** will be used by study participants.

- The study participant emphasised that the materials provided, i.e. the acceptance and rejection factors, configuration design features, guidelines and recommendation help them to reach an agreement easily and help them through the discussion process, I.e. it did not take long for the participants to discuss and reach an agreement.
- Also, the study participants mentioned that the study materials provided help them select the right checklists, also consider all the options that apply to them and prevent them from ignoring certain elements and sub-elements.
- The study participants mentioned that the templates representing various factors and design configuration features are useful, but they stressed that some of the checklists have too much text and recommended the text to be shortened to enable easy and quick read which could help enhance their understanding of the templates.
- While the majority of study participants appreciated the explanations for main factors and sub-factors, however, some of the participants suggested that they would like to see more explanation of key words and examples for certain terms on the templates to help improve their understanding, e.g. reinforcement function, goal setting, monitoring, i.e. they think the monitoring includes personal details, harsh penalty, negative feedback, progress bar and leader board, I.e. pictures.
- The study participants mentioned that the evaluation study was too long and they were tired before the end of the study. They recommended conducting two or three studies for the evaluation which could help them properly complete all the evaluation tasks.
- For the study participants, the negotiation and agreement process was easy. They agreed on their selected preferences of the key acceptance and rejection factors and configuration design features, and expressed the reasons for their selected choices. The researcher ensured that sufficient clarification was given where it was needed during the study, which aided the participants in completing this section of the evaluation.

TABLE 39: SAMPLE RESPONSE OF THE THIRD FOCUS GROUP SESSION ACCEPTANCE FACTORS

Main factors	Acceptance	Sub-acceptance factors	The features the participants agreed on
Entertainment		Award as entertainment	<p>Awards- The participants agreed that it is useful for the group to have award specially points when users are making progress towards the goals.</p> <p>Penalty- The participants agreed that reducing point is useful to help make</p>

		<p>users be aware of their usage and motivate them to achieve the goals,</p> <p>Gamification mechanism: The participants agreed that the group should have leader-board and progress bar, they found these two features useful to motivate them to reach their target.</p>
	Peer comparison as entertainment	<p>Peer comparison, the participants agreed that it is useful for a peer to compare their usage with others, “I would like to see how I and others are performing”</p> <p>Peer comparisons based on group goals and target, the participants agreed with the usefulness of peer comparison” it is useful when the group allow me to see how I and others are performing toward achievement goals”.</p>
	Goal achievement as entertainment	<p>The goals should be set as an achievable goal. The participants agreed the on usefulness of setting an achievable goal “<i>if I achieve goals that would change my feeling and I will be excited to achieve the next target goals</i>”</p> <p>The goals should have more than one target, The participants agreed that they target “<i>should be divide into daily, weekly and monthly target</i>”.</p> <p>The group should have monitor system, The participants agreed that it is useful the group monitor the time spend using digital media. “<i>it is useful for the system to monitor my usage and at the end of the day the system should provide a short summary about my achievement toward the daily target goals</i>”</p> <p>The system should provide reward, the participants agreed that the system should provide rewards such as points based on members goals achievement.</p>
Awareness tools	Self-awareness	<p>Provide frequency of the pop-up warning feedback to raise awareness regarding digital media usage. The participants agreed that the pop-up warning feedback is useful to raise awareness about the usage and “<i>if a user exceed the usage limit, the system should provide pop-up warning messages about the usage. The warning message should be provided just twice, the first warning when the usage</i></p>

		<p><i>exceeds 75% of the usage limit and the second warning when the usage exceeds the usage limit</i>".</p> <p>Group moderators provide feedback to influence and raise awareness of usage digital media. The participants agreed that the moderator should provide <i>"a feedback to the members who exceed the usage because this would help to raise their awareness about the usage"</i>.</p> <p>Group moderator or the platform send a weekly report which include user average usage and the level of addiction. The participants agreed that <i>"the system should provide weekly usage summary and the target achieve"</i></p>
	Peer comparison as an awareness	Peer comparison feedback e.g., feedback based on comparing you to other members goal achievement. The participants agreed that feedback based on <i>"comparing my usage to other group members goals achievement would help me to raise my usage awareness if my achievement is lower than others"</i>
	Achievement goals	<p>Goal achievement. The participants agreed that goal achievement would help members to know if they are capable of controlling their social media usage, <i>"if they could not achieve any progress that would raise their awareness about the problem"</i>.</p> <p>Difficulty to achieve proximal goals would raise member awareness of the problematic using of digital media. The participants agreed that <i>"if any member found the goals difficulty that would raise awareness about their problematic of digital media usage"</i>.</p>
Education tools	Peer learning	<p>Environment to learn from peers how to they successfully achieved the group goals. The participants agreed that the group could have ex-addict because this would help <i>"group members to learn from ex-addicts experience by asking questions and providing advice and guidance based on their experience"</i>.</p> <p>Environment to learn from a peer. The participants agreed that it is useful for the group members to <i>"learn from each other by sharing real-life stories and successful strategies that help them to control social media usage"</i>.</p>
	Moderator role	Environment to learn from moderator leadership role. the participants agreed

		the “ <i>moderator guidance and feedback would help members to learn how to control their usage also they can learn how to manage the group and provide guidance</i> ”.
	Set up goals	<p>Environment to learn how to set up achievable and effective goals and their plans. They agreed the group would help them to learn how to setup reasonable and achievable goals, e.g “it is useful to learn how I can set up achievable and suitable goals”.</p> <p>Environment to learn from moderator how to set up and review the goals. The participants agreed that they can learn from the moderator how to review the goals.</p>
Prevention tools	Moderator feedback	<p>Group moderator send supportive information to peers struggles to achieve the goals. The participants agreed that the moderator should provide supportive information and advice to members who struggles to achieve the goals. For example, a participant said “<i>it is useful for the moderator to be a therapist or ex-addict, the moderator will provide helpful strategies and information to help users achieve their goals</i>”.</p> <p>Group moderator provides warning, strict, formal and order feedback to members who does not adhere to the group rules and goals target. The participants agreed that the moderator should send “<i>warning and strict feedback to users who disrupt other members</i>”.</p>
	Peer Feedback	Participants do not agree on peer feedback
Support tools	Provide advice	<p>Environment to have intelligent system, the system sends a feedback based on the track and monitor user usage, compare user progress with self-pass progress. The participant agreed that it is useful for the “<i>system to monitor the usage and compare user progress with their self-past because this would help to their control usage</i>”.</p> <p>Environment to provide experienced moderators who can provide advice and guide members to manage the digital media usage. The participants agreed that it is useful for the moderator to “<i>support</i>”</p>

		<i>group users by providing advice and guidance and tell stories”.</i>
	Feedback	<p>Environment to peers to feel safe to talk about things that are mostly affect them when they reduce the digital media usage. The participant agreed that it is useful <i>“if they talk with moderator or other members about their feeling when they reduce the time of using social network”.</i></p> <p>Environment to suggest alternative activities to replace and distance myself from the negative behaviours and enhance control using digital media. The participant agreed it is useful for the group moderator to provide alternative activities to help them reduce their digital media usage, for example, <i>“doing exercise or suggest some book to read”.</i></p>

TABLE 40: SAMPLE RESPONSE OF THE THIRD FOCUS GROUP SESSION REJECTION FACTORS

Main rejection factors	Participants selected features	Reason for choice
Intimidation	Negative feedback	The participants agreed negative feedback would make them <i>“leave the group”.</i>
	Harsh feedback	There are two opinions, first, some participants agreed to receive harsh feedback and <i>“the harsh feedback should come from the moderator”.</i> Second, the participants reject the harsh feedback because it <i>“would affect my emotion”.</i>
Overly Judgment	Reject a group if I am judged by peers who are only online contact	The participants agreed that receiving judgement feedback from any group member is not acceptable.
	Reject a group if I am judged by online peers who are also real-world contacts	The participants agreed that they do not accept to be judge by peers in real-life and a participant mention that <i>“if the group should present our nickname and picture as avatar that would help because no one will know us in real-life”.</i>
Unmanaged interactions and unclear membership.	Weak moderator which allows loose and relaxed rules e.g. accepting conversations and interactions that are not related to the wellbeing issue	The participants reject weak moderator and cannot ban the user who disrupt other members. A participant mention that <i>“I reject to join a group that has a weak moderator and cannot control the conversations and interactions between members,</i>

		<i>the moderator should block a member who disrupt other members”.</i>
	Large group size as it may not feel as a coherent group and members find difficulty into focus on the group goals	The participants agreed that the group should be small in size and they reject to join a large group.
	Reject the group members profile has real name and pictures	The participants agreed that the group members profile should have nickname and avatar pictures.
	Reject a group when there are conditions to exit the group, e.g. to tell the moderator in advance	The participants agree the group should have conditions to exit from group, “having conditions to exit from the group would make group members take the group serious”.

TABLE 41: SAMPLE RESPONSE OF THE THIRD FOCUS GROUP SESSION DESIGN FEATURES

Main Online peer group features	Sub-acceptance features	Participants selected features and reason for choice
Moderator	Moderator Nature	Blended, i.e. human and software together. The participants agreed the group moderator should be human and Software, i.e. <i>“I prefer to receive daily feedback from the system about my digital media usage. I do not prefer the human moderator to track my usage because I do not trust human moderator as he/she could see what I am doing on social network”</i>
	Moderator Authority	Manage membership, the participants agreed that the moderator should be able to add a new member and <i>“ban members who disrupt other members or open conversation and discussion out of the group aims”</i> . Ban members from certain activities. The participants have two opinions about this feature. First, some participants agreed the moderator should ban member from certain activity, <i>“if a member exceed the daily goal target, the</i>

		<p><i>moderator should ban the member from the application the member used more, such as Facebook</i>". Second, some participants mentioned that they do not prefer the moderator to ban member from the digital media network and they prefer other penalty like reduce points.</p>
	Moderator issue rewards and penalty	<p>Rewards to members based on the improvement of their performance. The participants agreed that <i>"the moderator should provide reward to member who achieve improvement toward goals"</i>. Rewards based on the member's interactions within the online group. The participants do not reach an agreement in rewards based on interaction and they have two opinions, first, the participants disagreed and they mention that <i>"I do not want to be rewarded because I help other members, the reward should be provided based on my goals achievement and goals progress"</i>, and second, the participants mentioned that <i>"the group should aim to support each other and provide a reward such as badges that would motivate the group members to help each other"</i></p> <p>Penalty based on the poor performance. The participants agreed that the moderator should provide <i>"penalty such as reduce points to members who have poor performance"</i>.</p> <p>Penalty based on the member interactions within the online group. The participants agreed that the moderator should monitor group interactions and provide penalty to member who distract others, such as <i>"block for short period of time"</i>.</p>
	Moderator Skills	<p>Had the well-being issue themselves in the past and recovered from it. Some of the participants agreed that the</p>

		<p>moderator should be “<i>an ex-addict and had the problem before</i>” and other participants disagreed that the moderator should be ex-addict and a participant mentioned that “<i>the group should have a therapist moderator and a normal member who is ex-addict to support users and help them by telling story and providing tips to help users control the social media usage</i>”.</p> <p>Experience in the domain, the participant agreed that the moderator should be “<i>a therapist or have an experience in behaviour change</i>”.</p>
	Strategy of allocating a human moderator	<p>Experience, the participants agreed the moderator should be a therapist.</p> <p>Rota-based, some of the participants agreed that the moderator “<i>could be rota-based but for members who achieve their goals</i>” and others disagreed the moderator to be rota-based and they mentioned “<i>the moderator should be a therapist and should not change and should continue with us till all group members achieve their goals</i>”.</p>
	Monitor system	<p>Access the data about members performance, the participants agreed that the moderator should “<i>have access to members goals achievement and progress and based on that provide guidance and advice</i>”.</p> <p>Access data around the style of communication of members, the participants agreed that the moderator should monitor member interaction within the group “<i>and should detect any member distracting other members</i>”.</p>
	Moderator tasks to manage performance goals	<p>Review goal achievement with members frequently, the participants agreed that the moderator should review their goal achievement and “<i>based on the achievement the goals could be update</i>”.</p>

		Discuss barriers to goals achievement with members, the participants agreed that the moderator should discuss the goals <i>“with members who have low progress or struggle to achieve the goals and the moderator should resolving conflicting goals if any”</i> .
	Moderator tasks to provide feedback	Feedback about how the group is performing as a whole, the participants agreed the moderator should provide <i>“weekly feedback based on how the group is performing towards the goals”</i> . Feedback about self-progress to members, the participants agreed that the moderator should provide feedback <i>“which compare self-improvement and it should be provided after a period of time from joining the group”</i> .
Goals setting	Behaviour targets	The participants agreed that the group should help them to control the time of using digital media during the day.
	type of goals	Distal goals, the participants agreed that the group members should set <i>“long term goals”</i> . Proximal goals, the participants agreed that the members should set <i>“two types of short-term goals which is daily and weekly”</i> .
	set goals	Collective -set, the participants agreed that the gaols <i>“should be set collectively and all group members should agree on the set goals”</i> .
Monitoring System	Monitoring progress	Automated-monitoring, the participants agreed that the monitor in the group should be automated only.
Privacy	Restrict visibility	My profile data, the participants agreed that their information should be protect and no one should have access to other members information. My performance data, the participants agreed that only the moderator should access their performance.

		Feedback I received; the participants agreed no one should access their feedback.
Comparing Behavioural	Comparison of performance	Self-comparison, the participant agreed that the system and the moderator should compare their self-past progress. compare how the group as a whole is performing. the participant agreed to be compared with whole group performance.
Exit Procedure	leaving the group by certain members	Members who violate the group norms and mission should be forced to exit the group; the participants agreed that the disrupt member should leave the group.
	violate members should leave the group	The moderator, the participants agreed that the moderator should “ <i>ban member who disrupt other group members</i> ”. Group vote, based on a recommendation by some members, the participants agreed that the group should vote before “ <i>banning any disruptive member</i> ”.
	Progress Feedback	Group Moderator, the participants agreed that the feedback progress should be provided by the moderator.
Feedback features	Feedback on your progress	Peer-past progress, the participants agreed that the moderator should provide a feedback about “ <i>self-past progress since they join the group</i> ”. Distal goal performance feedback. The participant agreed that the group should be provided their goal long-term goals achievement, i.e. “ <i>I prefer the group to send monthly feedback about how I am progressing toward my long-term goals</i> ”. Proximal goal performance feedback, the participants agreed that the group should provide weekly feedback about their distal goals, i.e. “ <i>I would</i>

		<i>like to receive weekly feedback and include my short distance goals achievement”.</i>
	Feedback Framing and Tone	Mentions both positive and negative points. The participants agreed that the feedback should include both positive and negative points and the moderator should provide negative feedback to the users <i>“who achieved a low level of progress”.</i>
	Goal Feedback Timing	Feedback after exceeding the goals, the participants agreed that the system should provide <i>“warning feedback to the user after they exceed the goals”</i> Querying the software about performance and feedback when I like to do so, the participants agreed that the users could query the system to provide <i>“a report about their performance from the first day join the group”.</i>
	Communicating methods of the feedback	One-to-one chat with moderator, the participants agreed that the group should have one-one chat with the group moderator <i>“to discuss the issues that they are facing to achieve their goals”.</i> Audio Feedback, some of the participant agreed that the moderator feedback should be <i>“audio feedback, because audio would help the moderator to express the moderator tone”</i> but others do not agree with the audio feedback and they prefer text.
Membership criteria		Friendship to some or all the group members, the participants agreed that the group members <i>“could be friends that would build trust between group members”.</i> Similar digital media issue to other members, the participants agreed that the group members should have <i>“similar social network problem, for example, have problematic Snapchat usage”.</i>

Reinforcement function	Reinforcement function-based performance	<p>Adjusting the score and level of members based on performance and interaction. The participants agreed the system should “<i>add or reduce points to the group members based on their achievement toward the goals</i>”.</p> <p>Banning members, temporarily or completely, the participant agreed that the moderator should “<i>ban member temporarily who disturb others members</i>”.</p> <p>Recognising top performers, the participant agreed the group should have “<i>leader boards for weekly performance that would motivate users to achieve their goals</i>”.</p>
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8.8 RESEARCHER’S OBSERVATION

This section addresses the evaluation aims, which was proposed at the start of this chapter. Based on the outcome of the evaluation and the observation and discussion conducted at the end of the study, the participants considered the EVAFAR materials to be understandable in general. The materials were found to be useful in helping the design configuration process of the online peer support group. The participants stressed that specifying their acceptance and rejections factors and design features was mostly easy, and that they were completely engaged in the process, which demonstrates the usefulness of the proposed materials in supporting the configuration design process of the online peer support group. In terms of efficiency, participants considered the proposed materials to be mostly simple to follow. For more information on these, see Table 40.

TABLE 42: SUMMARY OF PARTICIPANTS OPINION ON THE MATERIALS

<p>Understandability</p> <p>The templates give the configuration process a straightforward structure that makes it simple to follow.</p> <p>It was thought that providing reasons for preferred factors required some degree of thought, hence writing these reasons took some time.</p> <p>Some of the study participants suggested that providing more examples on the templates would help them understand more what is expected from them and how to complete the templates.</p> <p>Both the study participants and the system analysts stressed that the evaluation supporting materials render the elicitation process much easier: “<i>It is beneficial that I can ask questions and turn to the other supporting documents for reference</i>”.</p>

Although the participants agreed that the approach was simple to understand, they recommended that the induction of the materials be conducted separate from the evaluation study to prevent information overload and enhanced their understanding of the materials.

The templates are organised in a sequential manner, such as starting with the acceptance factors first, followed by the rejection factors and the configuration design features.

Some participants suggested that some of the terms on the templates were a bit difficult to comprehend and that they to be explained.

Usefulness

The study participants emphasised how useful the various activities in directing them through the feature's selection process in an easy-to-understand manner.

In addition, the supporting materials presented were useful in helping them focus the discussion and selection on particular factors.

The templates provided was useful in aiding them look at all the factors and sub-factors of the acceptance and rejection factors and configuration design features for the online peer group, instead of taking a broad view of the factors.

The usefulness of the method was stressed by a majority of the study participants as one participant commented "*dividing the process into various activities and different steps in each activity, made the process very useful*".

The method's usefulness was also demonstrated by the participation of people with a wide range of similar backgrounds and experience in the evaluation study.

The study participants stated that the templates for the evaluation were useful because they enabled them to understand all of the factors needed for the online peer group in great detail.

The study participants said that putting each factor related to the online peer group on its own template and asking questions specific to that factor helped them avoid uncertainty when specifying their preferences for the templates and think of factors they had not considered before the evaluation study.

The explanations for the main acceptance factors and sub-factors provided was received well by the study participants, they mentioned that such explanation helped them in thinking about how to express their preference for each of the template elements.

The user participants and system analyst also said that the examples given were helpful in thinking about how to define specifications for each of the template components.

Comprehensiveness

The scenario generated in the generation step were used to guide both the elicitation activities of acceptance and rejection factors for the online peer group.

The study participants agreed that the evaluation phases cover various activities and factors required or that would inform the design of the online peer group.

Completeness

The scenario generated in the generation step were used to guide both the elicitation activities of acceptance and rejection factors for the online peer group.

The study participants agreed that the evaluation phases cover various activities and factors required or that would inform the design of the online peer group.

Efficiency

The system analyst mentioned that they found it easy to explain and guide the evaluation process following the materials given.

The participatory nature of the elicitation process, according to the study participants, allow them to discuss with one another, which helps the participants effectively articulate their preferred factors for the online peer group.

Additionally, the guidelines and recommendations given with the other materials were effective in helping the system analyst support the study participants express their acceptance and rejection factors and configuration design features.

The study participants were able to identify more acceptance and rejection factors and design configuration features and agreed on their selected features using the thesis findings compared to those identify without the support of the thesis findings.

8.8.1 DISCUSSION

The designer found that when the participants followed a classic software engineering process without any supporting materials, the participants could not determine some features for the online peer group, and they struggle to make a decision or reach an agreement. Also, the participants did not have a clear idea about what online peer group features they can accept or reject in design.

The participants were not familiar with or had a clear understanding of the online peer group features. For example, the participants struggle with the comparison feature, and they did not know how the comparison works within the group. Additionally, the participants did not understand how the group monitoring system works. Regarding the agreement, the participants took a long time to agree about the configuration design features.

The designer found that the participants lacked knowledge regarding the group features and specified features based on their experiences in the digital media group, such as WhatsApp and Instagram group. For example, the participants agreed that the group should have a moderator. Still, they reject the human moderator to monitor their usage because they thought that the moderator could see what they are doing in the digital media. Also, the participants prefer the group to have group goals, but they did not know what types of goals the group should have i.e., distal or proximal goals. Regarding the feedback, the participants agreed the group should have feedback, and the feedback should be provided by the group moderator only. Moreover, there are some features that should come together, and the participants accept one of them, e.g., the participants prefer penalty, and they did not prefer the group to have a reward.

With the templates

The designer found that the participants were provided with the EVAFAR templates to help configure online peer groups. The templates help the participants understand the online peer group's design features and help them determine the acceptance and rejection factors. However, the designer found that the participants took a long time to reach an agreement for some features

and other features; they could not reach any agreement. Also, the designer found that the participants selected conflict features, e.g., they accept the harsh penalty, but at the same time, they reject being banned from the group. The participants reject any member to be banned from the group, but they accept a disruptive member to be banned. Also, the participants were unconvinced about peer comparison because they are worried about privacy and their profile information, and this made the discussion take a long time. The designer had to stop the discussion.

Additionally, the participants were unsure how the peer comparison in the group works, and during the discussion, they took too long to reach an agreement about it. During the session, the designer observes that some of the participants do not want to continue the discussion and just agreed with whatever. The following are some examples of the features that the participants disagreed on:

- The participants could not reach an agreement about difficult goals. Some of them prefer the goal to be difficult, whilst others want the goal to be reasonable.
- The participants are concern about privacy and their details.
- The participants took a long time to reach an agreement about judgemental feedback and some of the participants agreed to have judgemental feedback. At the same time, others disagreed because the discussion was too long, ending with voting.
- The participants did not agree to have a reward or penalty in the group. Still, they agreed to have gamification like a leader-board “there is no point having penalty and rewards, but the leader-board will motivate us to achieve our goals”.
- The participants agreed about the monitoring system, but they are concern about privacy, and they provided recommendation or conditions about the monitoring system privacy.
- The participants agreed about rotation, but at the same time, they are worried about some features of the moderator, such as ban member and privacy.

The designer found that the participants agreed smoothly, and there is not much discussion between them except when they have questions and want some clarification about the materials. The materials and templates helped the participants select the acceptance and rejections factors for the online peer group and the design features. The guidelines and recommendation helped them to reach an agreement quickly. For example, the participants reach an agreement about the monitoring system quickly, and they faced no difficulty.

The participants’ discussions ran smoothly because the recommendation provided answered all their questions concerning the comparison and privacy. Also, the discussion about judgemental feedback went smoothly because the recommendations help the participants. The designers found that the guidelines helped the participants to agree about the reward and penalty. The participants agreed about reward and penalty in the group “a disruptive member should be banned from the

group and a member who did not achieve any goal should have their points reduce. If any member achieves or progress towards their goals, they should receive points”.

The participant mentioned conflicting and difficult goals and goal achievement and that they are worried about privacy when using leader board. Therefore, they want more privacy to be implemented when using the leader board.

Finally, the participants who were provided with templates and guidelines mentioned that the templates are too long, and they were tired during the focus group sessions. Also, some of the checklists are long, and the participants recommended that it would be better if the checklists are written as short sentences. Lastly, some of the keywords are not understandable and there is a need for the templates to be provided with a glossary with the keywords and some examples to clarify the meaning.

8.9 THREATS TO VALIDITY

In this section, the threats to validity for this research will be presented:

- The incentive offered to the study participants as a thank you for participating in the evaluation study may have motivated them to give a positive answer to the proposed materials. However, the study participants were compensated at the end of the session, not before the study date, to help alleviate this.
- Based on the researcher's estimates, the sessions were split among the different activities employed in the process. The amount of time allotted to each template during the elicitation may have influenced the accuracy of the data collected. However, to address this constraint, towards the end of the sessions, the study participants were given free time to add their thoughts and feedback on all of the evaluation session's activities. Also, throughout the process the system analysts and researcher were at ease and provided sufficient guidance to the participants. As a result, the majority of the participants were able to properly compose their configuration design features for the online peer group.
- Although the evaluation study may have gained from a larger number of study participants to help ensure the elicitation of different views, the time constraint and covid pandemic meant that only 22 people could be selected. However, since the participants admitted to having issues with social media, a variety of acceptance and rejection factors were still gathered. Since the aim of this exercise is to demonstrate a principle, the number of participants has no bearing on the elicitation's outcome.
- The case and the scenarios used in the evaluation study was briefly outlined to represent the platform and the issue users encountered using such applications, the explanation given was sufficient for the intent of the study and the evaluation study's time constraint.

- The researcher was involved as a “participant as observer” in the session for purposes of clarity and understandability, however, the researcher had no influence on participants’ choices or ideas. In the preparation period before starting each session, the researcher also made sure to avoid over-explaining the task and the materials, as this might have biased and affected the creativity of the participants.

8.10 CHAPTER SUMMARY

This chapter described how the thesis findings, i.e., online peer group acceptance and rejection factors and configuration design features and supporting materials were evaluated. The approach aims to monitor digital usage by eliciting the configuration and design features for online peer groups. The materials were evaluated using a case study approach, which enabled researchers to compare how the configuration design process would be handled with and without the thesis findings and make some conclusions. According to the chapter’s findings, the acceptance and rejection factors and the configuration design features, and the other supporting materials could aid the analyst and design team in configuring the design features for the online peer group. The thesis conclusion and future work will be explored in the last chapter.

9. CHAPTER 9: CONCLUSION

Problematic use of digital media has lately appeared as a serious problem and impacts the individuals' daily activity. Also, certain compulsive and obsessive style of use, as well as an over-reliance on digital media, may have negative effects, such as decreased participation in real-life societies low work productivity, depressive character, and a lack of sleep.

An increasing number of studies are conducted on the use of technology to tackle problematic behaviour and improve wellbeing. With advancements in sensing technologies and mobile devices, as well as widespread internet access developed opportunities for employing technology to support behavioural change and self-regulation processes in a more intelligent, contextualized, and situation-aware manner. Online peer groups are a form of technology-supported behaviour awareness software intended to provide peer support, counselling, motivating and learning atmosphere, and ambivalence lessening through sharing and hope installation. Online peer groups are a synthesis of different influence techniques, including peer pressure, commitment and goal setting, surveillance, and authority through moderator or caregiver.

9.1 RESEARCH OBJECTIVES REVISITED

This section addresses and revises the research objectives as stated in Chapter one in light of the thesis results.

Objective 1: Literature review

To achieve this objective, the research has looked at the literature in digital addiction from psychology perspective, including behaviour change theories in order to aid a detailed understanding of addiction psychology for behaviour change. Also, to gain a better understanding of peer support groups in conventional addiction, the research reviewed them. In addition, another focus of the literature review was on gaining knowledge and understanding about the system used for behavioural change purposes. The aim was to help develop a deeper understanding of the research problem and the development of knowledge relevant to the research problem. Exploring and evaluating relevant literature would also aid in determining knowledge already established about the research subject. Finally, the literature review would aid this research in laying the groundwork for the thesis outcome.

Objective 2. Explore the acceptance and rejection factors of online peer groups

To achieve this objective, the research explored the factors that could affect users acceptance or rejection of online peer groups. Qualitative techniques were employed to investigate the behaviour. Furthermore, the researcher employed quantitative method to investigate the impact of culture, personality, self-control, gender, willingness to participate in the groups, and

perception of usefulness on acceptance and rejection factors. The results of the studies showed factors that were categorised into five main acceptance factors and four main rejection factors and their associated sub-factors. This objective uses the Technology Acceptance Model (TAM) as a standard model to investigate user perceptions of techniques regarding ease of use and usefulness, subjective norms surrounding the issue and technique, and their effects on design and management of the group. The findings of the review revealed five elements of goal setting, which was presented in five reference checklists.

Objective 3. Explore the variability facets of online peer groups.

To achieve this objective, a qualitative technique was employed to investigate the variability requirements of online peer group systems and investigate the preferences for the various users. The interviews findings revealed that the participants suggested three elements that should be included in the design of online peer groups, i.e. moderator, functional governance, and non-functional governance, but they had different preferences for designing these variables and features, according to the findings. The findings revealed that the participants recommended four moderator features for the moderator, and four functional and four non-functional governance features. The interviews aimed to investigate the variability space of the design of online peer group applications to satisfy various user preferences. The study findings revealed interrelationships between different performance variability of an online peer support group's design in specific findings. In addition, ten paradoxical and conflict in the variability requirements of the online peer group which would require further investigation.

Objective 4. Propose materials for agreeable peer group configuration.

The EVAFAR materials was proposed with the help of the results of objectives I and 2. Through following objectives 1 and 2, information about the diversity and possible discrepancies in online peer group design features configuration were gathered. The materials include acceptance and rejection factors and variabilities design features as well as steps to follow when using the materials. Also, guidelines and recommendation were provided for the relevant stakeholders to follow when using the materials to help improve the negotiations and agreement process for configuring the online peer group design features. To use the EVAFAR materials, consensus building model could be used for agreeable peer group configuration.

Objective 5. Evaluate the usefulness and efficiency of the EVAFAR materials in design configuration of online peer group configuration features to manage problematic digital media usage.

To achieve this objective, three focus groups were performed to evaluate the usefulness and efficiency of the thesis findings in the configuration process of online peer group design features to manage problematic digital media usage. The findings of objectives 2 and 3 were employed to

help the creation of elicitation templates depicting different acceptance and rejection factors of online peer groups. In addition, guidelines and recommendation for guiding the completion of the templates were provided with the templates. A two-stage assessment study was conducted to assess the thesis findings. Participants were first invited to participate in a focus group session aimed to determine the usefulness of the acceptance and rejection factors of online peer groups without the use of the findings and its accompanying documents. This section of the evaluation was designed to see whether the participants could specify their acceptance and rejection factors without using the proposed materials. Participants in the second stage took part in a focus group session aimed at defining their online peer group requirements using the proposed materials. The aim of this stage of the evaluation study was to see whether the proposed materials could assist participants in expressing their configured online peer group design features, with a focus on the materials' understandability, completeness, efficiency, comprehensiveness and appropriateness. The results of the evaluation show that the proposed materials are simple to understand and useful for configuring the online peer groups design. According to the study participants, defining the configuration design features without the use of the materials was a difficult task. As a result, they do not take into account all aspects of acceptance and rejection factors during the process, and the information they provide is minimal.

9.2 CONTRIBUTION TO KNOWLEDGE

This research thesis adds to the increasing body of knowledge in the field of problematic digital media usage and our understanding of the use of online peer groups to manage such a problem with a particular focus on configuring online peer group design requirements. The key contributions of this research thesis will be discussed in the following sub-sections.

Main acceptance factors of online peer group

First, this thesis proposed acceptance factors of online peer groups. The thesis investigated the key factors that could make users accept the online peer group. When software and systems engineers develop and introduce an online peer group for users who have a problem with digital media, these acceptance factors should be taken into account to ensure an effective implementation of such systems. These acceptance factors are discussed in Chapter 4 of the thesis. The acceptance factors were explored following qualitative methods, i.e. interviews and focus groups. Five main factors and 16 sub-factors were perceived by the study participants as acceptance factors for the online peer groups and would therefore require to be considered in the design of such systems.

Main rejection factors of online peer group

Second, this thesis proposed rejection factors of online peer group. This research looked at the key factors that could lead users to reject or avoid an online peer group. These rejection factors when not considered in the design of online peer group, could have an impact on the system's effectiveness. These rejection factors are discussed in Chapter 4 of the thesis. The rejection factors and their sub-factors were explored employing interviews and focus groups. Four main factors and 8 sub-factors were identified by the study participants as rejection factors for the online peer group would require careful consideration in the design of such a system to ensure success of the system.

The variability facets of online peer groups the moderator design features

Third, this thesis proposed various variability factors of online peer group system design to satisfy different preferences of the users. The study participants suggested the group moderator as one of the main variability features. The group moderator features are discussed in Chapter 5 of the thesis. The group moderator features were explored following a qualitative method i.e., interviews and secondary analysis of two focus group studies. The study participants suggested 6 sub-factors and 16 sub-sub factors for the group moderator that should be included in the design of online peer groups and their preferences for the successful design of the features. The participants in the interview suggested different design preferences for the moderator tasks, how to delegate moderators, and the moderator's skills and authority. The moderator element was one of the key issues listed by interview participants.

The variability facets of online peer groups the functional governance and non-functional governance features

Fourth, this thesis proposed governance functional features and the non-governance functional features. The functional and non-functional features are discussed in Chapter 5 of the thesis. These features were investigated employing a qualitative technique i.e. interviews and secondary analysis of two focus group studies. For the functional governance, 4 main features and 12 sub-features and 4 main features and 7 sub-features for the non-functional governance. Also, the study participants make numerous recommendations about the design of the non-functional requirements and how to govern the requirements of the functional features. The interview revealed that the study participants have variability factors in the design and governance of the online peer group's non-functional requirement.

Guidelines and recommendations

Fifth, this thesis proposed a set of guidelines and recommendation to help the designer during the configuration design process to avoid conflict in the design features and to determine which feature requires other features. Also, the guidelines and recommendation would make some of the features clear to the designer and to determine the features that exclude other features.

9.3 THESIS LIMITATIONS

Despite the fact that the research met its primary goals, it has certain limitations that may have affected the results. The following are the key limitations of the thesis.

- Limitation one of the thesis is one of the most important considerations when creating questions, is ensuring that all users understand the questions as intended and are able to answer to them. A pilot study with typical participants was conducted to overcome this limitation, after the study, some questions on the evaluation templates and the study questions were revised and modified to ensure clarity.
- This research study focuses on users who have self-identified as having a problematic usage with digital media and are seeking assistance. While targeting this group of people reduced a wide range of denials of problematic behaviour/usage, the findings could have been limited to those people. This has also contributed to a sufficient level of desire and readiness to change the behaviour. This may be sample bias. Non-addicts, non-help seekers and individuals who may show signs of problematic digital media usage but deny it may have differing perspectives on the online peer group design requirements/features.
- Since the study used convenience sampling and all of the participants volunteered to participate, the sample may have been biased. If the study sample size was larger, it would also have more credibility. However, the study's findings should not be interpreted as a generalisation of the design requirements for online peer group. Instead, the researcher recommends using them as a starting point for the online peer group features for changing the problematic behaviour.
- The exceptional circumstances caused by the corona virus pandemic affected the quality of the focus groups for evaluating the proposed EVAFAR materials. The focus groups were run online, and the researcher was unable to recruit the required number of participants, therefore, a small number of participants took part in the study. Also, the researcher was unable to have the participants in the same place, e.g. a seminar room. However, the participants who participated in the evaluation were able to provide their configuration features for the online peer group, negotiate and agree on their selected features.

9.4 THESIS RECOMMENDED FUTURE WORK

The main thesis findings, such as the variability facets, acceptance and rejection factors are collected from previous research performed for the thesis (see Chapters 4 and 5). Due to the time, it may take users to express their design requirements for the online peer group, the process could necessitate further investigation. The thesis's future work may include expanding on this knowledge and develop an online application to aid in the configuration process, such as list the main factor entertainment mechanism and its sub-factors and then include tick boxes for users to

choose their preference. The thesis highlighted the main online peer group design configuration, such as the users perceived acceptance and rejection factors. Also, in Chapter 6 descriptive and statistical analysis of the acceptance or rejection factors was performed. Another future work for the thesis should focus on quantitative analysis, such as clustering potential users based on their personality traits, self-control and gender, for example, users who have agreeableness traits and the features they prefer and cluster female and the online peer group features they prefer. Also, a future work should be around proposing a conflict resolution models to help resolve any conflict for reaching an agreement. Finally, a glossary explaining key terminologies will be provided together with the templates to help enhance users understanding. The finding in Chapters 5 and 7 show that people have diverse requirements, and preferences of the online peer group design features. However, it is not feasible to design online peer group platform that satisfies the requirements and preference of all users. To tackle this, we may need to classify the users to different types and develop personas that describe the different types of users and their requirements and preferences. Such categorisation would help to determine the actual requirements, needs, and preferences of the users in a more practical way. So, another feature work for the thesis should focus on quantitative studies to generate large set of data, perhaps through a large scale survey, and analyse it through machine learning to develop personas and classify the users requirements and preferences accordingly.

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11. APPENDICES

11.1 APPENDIX 1

The supporting materials used for the user study in Chapter 4 and Chapter 5.

Part A: Information Sheet



The title of the research project:

Engineering Peer Monitoring and Support as a Mechanism to Combat Problematic Online Usage

Invitation

You are being invited to consider taking part in this research study. This project is being undertaken by Manal Aldhayan a PhD student in the Department of Computing and Informatics at Bournemouth University.

Before you decide whether or not you wish to take part, it is important for you to understand why this research is being done and what it will involve. Please take time to read this information carefully and discuss it with friends and relatives if you wish. Ask us if there is anything that is unclear or if you would like more information.

What is the purpose of this study?

The aim of this research is to investigate ways to enable people regulate their online usage perceived to be moderately problematic. This includes domains like smart phone problem usage, problem gambling, etc. The techniques being investigated revolve around peer pressure and peer support.

Why have I been chosen?

You have been invited because of your background and experience in relation to problematic online behaviour. This research will involve experts in areas related to the problem space and also individuals who have or had problematic experience with online usage.

Do I have to take part?

You are free to decide whether you wish to take part or not. If you do decide to take part you will be asked to sign a consent form. You are free to withdraw from this study at any time and without giving reasons and without there being any negative consequences, up to the point where the data are processed and become anonymous, so your identity cannot be determined.

What will happen if I take part, and what do I have to do?

Depending on your role, you will be asked to participate in one or more of these activities:

- Interview sessions: in which the researcher will discuss with you individually about various aspects of the problem and potential solution. Your personal experience and opinion will be needed.
- Focus groups: in which the research will invite you and a number of individuals to discuss a topic in relation to the problem. The session could be also held as design sessions where you and other participants contribute to design templates and solution with the help of the facilitator.
- A diary study where you record your daily tasks in relation to the problematic behaviour and the suggested solutions. The diary study may take around 2 weeks and it may be followed by a brief interviews.
- Survey: to confirm the interview results in a large sample

What are the benefits of taking part?

You will be contributing to the knowledge about engineering online platforms which help people gain more control over their online consumption and habits.

What are the risks of taking part?

There are no speculated risks for participating in this study.

How my information will be used?

The data collected will be stored securely, and will be used only for the purpose of this study. The data will be completely anonymised before it appears in any type of publication. No other use will be made of them without your written permission, and no one outside the project will be allowed to access the original files.

Who will have access to my information?

Your confidentiality will be safeguarded during and after the study. Only the researcher and her research collaborators on the same project will be able to have access to your data. The data will be stored securely and destroyed immediately after use.

Will I be recorded, and how will the recorded media be used?

Yes, if you take part of the interview or the focus group sessions. The recording will help the research team to capture the information that will be sought from you during the interview or the focus group. However, you will be given the right to accept or reject recording the interview. No other use will be made of the recording without your written permission, and no one outside the research team will be allowed access to the original recordings. The audio recordings made during this research will be deleted once transcribed and anonymised. The transcription of the interviews will not include your name or any identifiable information

Contact for further information

If you have any queries about this research, please contact my PhD supervisor Dr Raian Ali by email on rali@bournemouth.ac.uk or by phone on 01202 966682 or by post to:

Dr Raian Ali
 Department of Computing and Informatics
 Faculty of Science and Technology
 Bournemouth University
 BH12 5BB

Complaints

If you have any complaints about this project please contact Professor Tiantian Zhang, Deputy Dean for Research and Professional Practice of the Faculty of Science and Technology at Bournemouth University at the following address:

Professor Tiantian Zhang
 Talbot Campus, Fern Barrow, Poole, BH12 5BB
 E-mail: researchgovernance@bournemouth.ac.uk
 Tel: 01202 965721

Thank you for taking the time to read this information sheet, and please do not hesitate to contact me if you have any queries.

Part B: Participant Agreement Form



**Bournemouth
 University**

Participant Agreement Form

Title of Project: *Engineering Peer Monitoring and Support as a Mechanism to Combat Problematic Online Usage*

Name and contact details of Principal Investigator:

*Manal Aldhayan
 Poole House, Talbot Campus, Fern Barrow, Poole, BH12 5BB, United Kingdom
maldhayan@bournemouth.ac.uk*

Name, position and contact details of supervisor: Dr. Raian Ali rali@bournemouth.ac.uk

	Please Initial or Tick Here
I have read and understood the participant information sheet for the above research project.	
I confirm that I have had the opportunity to ask questions.	
I understand that my participation is voluntary	
I understand that I am free to withdraw up to the point where the data are processed and become anonymous, so my identity cannot be determined.	
During the task or experiment, I am free to withdraw without giving reason and without there being any negative consequences.	
Should I not wish to answer any particular question(s), complete a test or give a sample, I am free to decline.	
I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the outputs that result from the research. I give permission for members of the research team to use my identifiable information for the purposes of this research project.	
I understand taking part in the research will include being recorded (audio) but that these recordings will be deleted once transcribed.	

I agree to take part in the above research project.	
---	--

Name or Initial of Participant

Date

Signature

Date

Signature

This form should be signed and dated by all parties after the participant receives a copy of the participant information sheet and any other written information provided to the participants. A copy of the signed and dated participant agreement form should be kept with the project's main documents which must be kept in a secure location.

Part C: FOCUS Group

FOCUS GROUP-1 (INCLUDING QUESTIONS)

Digital Addiction – Peer based software

Participant Hand-out

Saturday 7th March 2015

Background:

The idea of the software is to create a peer group based software in which members are joining together to either aid a peer's digital addiction or to treat their own digital addiction.

We will try to accomplish this with the technique of gamification (badges, leader board and points)

An avatar may also be used to give a more compelling design.

Assumptions:

- Anyone can join the group as long as all members agree.
- This project will aim towards 18-27 years olds
- Mainly targeted towards social network addicts

The aim of this focus group is to gain your insight into what you think of this idea and what you think will be needed for this software to work. This will help give a requirement specification of the design.

Examples of Roles:

Encourager – Rewards others through agreement, warmth, and praise

Follower – Accepts the ideas of others and often serves as an audience

Harmonizer – mediates conflict among group members

Questions:

If you were to design this software what would you do to make this effective?

What would motivate you to join and what would motivate you stay on the system?

How do you think the software should be structured in terms of interaction and support group?
what features do you think help contribute to the goal and what features do you think don't?
What penalties would you expect and what kind of rewards?
What sort of messages would you expect and how would you like them delivered?
What impact do you think social influence will have on the users?
What type of information do you think the software should provide?
What roles do you expect to see in this group?
What do you think of the idea and why?

Part D: Focus group 2

FOCUS GROUP 2 – PARTICIPANT HAND OUT (INCLUDING QUESTIONS)

Digital Addiction – Peer based software

Participant Hand-out (conductor copy)

Thursday 23rd April 2015

Background:

The idea of the software is to create a peer-group based software in which members are joining together to either aid a peer's digital addiction or to treat their own digital addiction.

We will try to accomplish this with the technique of gamification (badges, leader board and points)

Assumptions:

- Anyone can join the group as long as all members agree.
- This project will aim towards 18-27 years olds
- Mainly targeted towards social network addicts
- The Designs shown are from a logged in guest user perspective.
- An anonymous user will **not** be shown the friends and messages page.

Based on a previous focus group a design was made including features previously mentioned. The aim of this focus group is to gain your insights into what design aspects seem appealing and which do not. A thematic map has been given detailing the results of the last focus group, one of the aims of this focus group is to refine and expand on this.

The conductor will present two software designs on the projector. The conductor will then navigate through the design as the discussion is taking place, if you would like to be shown any specific page/feature at any time please ask the conductor. When speaking about any aspect of the design for the sake of the audio recording could you please specify what you are talking about?

Questions

- What is your first reaction to the home page?
- Do you think the layout of the design contributes to the sites goals?
- Do you think an avatar will help contribute to user's motivation?
- Does the navigation seem to have enough simplicity?
- Does the colour scheme seem attractive?

- Will you do what the arbitrator recommends /says? If yes why if no why?
- What interactive features would you want from this software?
- What type of personalisation would you recommend?

Part E: Diary Study- Interview Transcripts

Post Study Interview

Q1) What did you like about the messages that were sent over the course of the week?

It certainly encouraged you to use the phone less. I preferred the weekend breakdowns, because I'm generally more social on the weekend and use my phone in social environments. I found it very interesting to find out how much I actually used it.

Q2) What didn't you like about the messages?

I didn't really care too much about others and I preferred the personal updates.

Q3) Did you feel that your usage of the course of the week was typical of you?

It was a pretty Standard week. I was at home a couple of days which may have increased my usage a little.

Q4) Did the messages make you cut down usage at all or was it to do with schedule?

The first message overall of the weekend did encourage me to use my phone less but of course I still used other devices.

Q5) Towards the end of the week you were given the opportunity to message your fellow participants, why didn't you?

As I said I didn't care too much about the others. I think it was down to the fact that I didn't know the others and really I was just too busy to come up with an appropriate message.

Q6) Would you prefer a moderator set or individually set target? How about a target approved by a moderator?

I would prefer a moderator to set the target so the responsibility is out of my hands. I think the moderator confirmed targets would work quite well.

Q7) If there were a real-time chat or comment feature would you be more inclined to interact with others in the group?

Yes, I think a comment/liking system on people's post that is quick and easy to do would work best as it wouldn't take too much time. For instance I like the 'Say Congrats' automatic message you can send on LinkedIn

Q8) What incentives for hitting your targets, do you think you would respond well to? For instance leader boards, achievements, levels etc

I'd respond well to levels with rewards. ASOS does something similar where you get rewards for getting to a certain level. It would also be nice to share progress of Facebook/social media. Possibly allowing us to unlock better profile pictures as an incentive.

Q9) Walkthrough the design, what do you think about this design?

Good but would this be useable on a mobile phone or is everyone going to use it on desktop?

Q10) Do you know what you can do with these pages?

Yes, the design is simple enough to understand everything.

Q11) What information about other participants would you find useful when interacting with them?

There should be a dropdown menu for average data as this would be easier to fill out.

Q12) Are there any features you think you would benefit from?

Interesting but not identifiable profile pictures that can be chosen so there's some customisation.

Post Study Interview 2

Q1) What did you like about the messages that were sent over the course of the week?

That they were short and weren't huge blocks of text. I very much liked the application breakdown and I preferred the weekend messages because it's the time I use my phone the most.

Q2) What didn't you like about the messages?

In the final weekend breakdown message, I would have preferred a comparison to the previous weekend to actually see how they improved.

Q3) Did you feel that your usage of the course of the week was typical of you?

Yes, except one weekday where I used my phone more than usual as I was travelling for the most part of the day so wasn't able to work as much.

Q4) Did the messages make you cut down usage at all or was it to do with schedule?

No, I didn't feel like I was using my phone that much anyway so wasn't too much.

Q5) Towards the end of the week you were given the opportunity to message your fellow participants, why didn't you?

I didn't feel much of a connection to the others as I didn't know them.

Q6) Would you prefer a moderator set or individually set target? How about a target approved by a moderator?

I'd want to set my own target so that I feel comfortable with what I can achieve. If I was confident the moderator was an expert and didn't feel to be pushed too much then I might give them the responsibility then.

Q7) If there were a real-time chat or comment feature would you be more inclined to talk to others in the group?

I wouldn't want a real-time chat I think it makes it addictive in its own way. I'm not huge on commenting on posts but I'd most likely use a like system.

Q8) What incentives for hitting your targets, do you think you would respond well to? For instance leader boards, achievements, levels etc

Achievements would be cool. I like the Play Station trophy system where you get achievement trophies which carry different weight i.e. gold trophies are rarer than silver and bronze. Then you have a level based on the number of trophies that you have.

Q9) Walkthrough the design, what do you think about this design?

Yeah, generally pretty good and pretty simple.

Q10) Do you know what you can do with these pages?

Yes I think it's fairly obvious that you log in and can edit your information and view other profiles.

Q11) What information about other participants would you find useful when interacting with them?

Don't care for the bio on the profile. I think there should be some kind of Road map or at least some way to show the user's starting point and target.

Q12) Are there any features you think you would benefit from?

It would be nice to have an option to change between daily plan and weekly.

Post Study Interview 3

Q1) What did you like about the messages that were sent over the course of the week?

I felt that the daily updates were the best because I work over the weekends. Daily updates are useful as they give an insight into how much time actually spent working. I also liked the breakdown of usage for every application.

Q2) What didn't you like about the messages?

I would've liked more applications monitored but I understand this might not have been possible.

Q3) Did you feel that your usage of the course of the week was typical of you?

Yes, mostly. I certainly had more usage than expected, the small amount of times I used the apps clearly adds up to a large total time.

Q4) Did the messages make you cut down usage at all or was it to do with schedule? If not why?

A bit, I think sometimes your usage is not worrying because the time is warranted i.e. some of that time was spent looking things up for my work. The messages were useful to raise awareness and reflect on my usage.

Q5) Towards the end of the week you were given the opportunity to message your fellow participants, why didn't you?

I didn't know what to message them because I didn't know what they were doing.

Q6) Would you prefer a moderator set or individually set target? How about a target approved by a moderator?

I think you should allow people to set their own targets. Targets or achievements should be visible to others so that commenting/messaging can be given context.

Q7) If there were a real-time chat or comment feature would you be more inclined to interact with others in the group?

I think a real-time chat features is a bit of a paradox because you might spend more time talking on those messaging. The comment aspect may be more appropriate as it can be fairly limited.

Q8) What incentives for hitting your targets, do you think you would respond well to? For instance leader boards, achievements, levels etc

A Leader board creates competition which isn't helpful for this scenario.

I like the idea of levels and achievements, there's always a need to have something to 'show off' - Maybe a progress bar would be good, just something more visual to see progress.

Q9) Walkthrough the design, what do you think about this design?

I like the simplicity, it's very straight forward to use.

I think usage should selectable in some kind of drop box like '0 – 1 Hour'

Q10) Do you know what you can do with these pages?

Yes, as I said it's straight forward to use.

Q11) What information about other participants would you find useful when interacting with them?

With editing your profile, not sure about being able to fill in what every you want. Maybe limit the size of the 'about' section so there's still an element of personalisation.

Q12) Are there any features you think you would benefit from?

A Personalised dashboard with a link to a group timeline which has everyone's events on it.

Post Study Interview 4

Q1) What did you like about the messages that were sent over the course of the week?

The messages made you feel good about yourself because they were encouraging. I generally preferred the Daily targets.

Q2) What didn't you like about the messages?

They felt a little possible as the application didn't keep the messages if you had given feedback.

Q3) Did you feel that your usage of the course of the week was typical of you?

Yes the usage was typical of me.

Q4) Did the messages make you cut down usage at all or was it to do with schedule?

No, I think I would have if the problem was worse for me however.

Q5) Towards the end of the week you were given the opportunity to message your fellow participants, why didn't you?

There was a lack of personality as I didn't know them so didn't feel like I needed to care.

Q6) Would you prefer a moderator set or individually set target? How about a target approved by a moderator?

I think it should be up to the participant and not the moderator.

Q7) If there were a real-time chat or comment feature would you be more inclined to interact with others in the group?

I think I'd prefer some kind of commenting feature or like feature so that it's quick and doesn't require paying attention to the chat all the time.

Q8) What incentives for hitting your targets, do you think you would respond well to? For instance leader boards, achievements, levels etc

I think I'd like badges on profiles for specific achievements. Maybe a set of goals to do to achieve each task.

Q9) Walkthrough the design, what do you think about this design?

I like it, it's very simple and easy to use.

Q10) What can you do with these pages?

The design is pretty self-explanatory so edit profile and view other profiles etc.

Q11) What information about other participants would you find useful when interacting with them?

Nothing really other than what you already have on the design.

Q12) Are there any features you think you would benefit from?

It might be nice to have a group goal which has a more physical reward like a dinner out or something.

Maybe the opportunity to choose from a few recommended tasks that are tailored to each user.

Post Study Interview 4

Q1) What did you like about the messages that were sent over the course of the week?

The messages made you feel good about yourself because they were encouraging. I generally preferred the Daily targets.

Q2) What didn't you like about the messages?

They felt a little possible as the application didn't keep the messages if you had given feedback.

Q3) Did you feel that your usage of the course of the week was typical of you?

Yes the usage was typical of me.

Q4) Did the messages make you cut down usage at all or was it to do with schedule?

No, I think I would have if the problem was worse for me however.

Q5) Towards the end of the week you were given the opportunity to message your fellow participants, why didn't you?

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The design is pretty self-explanatory so edit profile and view other profiles etc.

Q11) What information about other participants would you find useful when interacting with them?

Nothing really other than what you already have on the design.

Q12) Are there any features you think you would benefit from?

It might be nice to have a group goal which has a more physical reward like a dinner out or something.

Maybe the opportunity to choose from a few recommended tasks that are tailored to each user.

Part F: Interview Questions

The interview questions are as follows:

1. What are your initial thoughts about online peer support groups?
2. What would motivate you to join such groups?
3. Would you have any conditions that must be met before you would join?
4. How do you think performance monitoring should work?
5. How would you feel about the software, the moderator or your peers giving you information about your usage and performance?
6. How would you feel about creating a profile of yourself within the group?
7. Would you set goals to manage your digital media behaviour?
8. What kinds of goals would you like to set?
9. What is your opinion of collective goals (i.e. goals set for the group as a whole such as disconnecting the entire group for 2 hours or reducing by 20% the overall time spent online by the group in a given week relative to the previous week)?
10. How do you prefer to set goals? When and why?
11. What would you think about using a moderator to manage the group and help agree a set of goals?
12. What sort of feedback messages would you expect:
 - a. from peers?

- b. from software?
 - c. from a moderator?
13. How would you like to receive this feedback and notifications?
 14. How would you prefer these messages and interactive mechanisms to be shared with the group (e.g. online notice board, shared post)?
 15. What format would you like the feedback to take?
 16. How would you feel about receiving information that compares your digital usage with that of other group members?
 17. How would you like rewards to be offered? For example, points, a leader board, privileges or vouchers
 18. How would you like to see penalties being applied? For example, banned from the group for a day, loss of points, having to perform extra activities
 19. Can you think of suitable rewards and penalties?
 20. Who should be given a reward? Why?
 21. Who should be given a penalty? Why?
 22. For how long do you think the group should exist? Are there any conditions to be met before it is disbanded?
 23. What do you think about people exiting the group before its mission is complete? How would this need to be conducted?
 24. Which characteristics would you expect the moderator to exhibit?
 25. What type of group information do you think the moderator should provide?
 26. What role would you expect the group moderator to perform?
 27. How should the group moderator be allocated?

11.2 APPENDIX 2: SURVEY

Online Peer Support Groups for Better Well-being: Helping by Sharing!

Thank you for helping me out.

This survey is about Online Peer Support Groups to combat and correct wellbeing issues. For example, people can join such groups to get help and support from each other and from moderators so that they become more aware and more in control of issues around obsessive gaming, fitness, smoking, etc. For an illustration of classic non-online peer groups.



We aim to develop principles and methods for **developing online platforms to host peer support groups** so that people can join and participate remotely and through their computers or smartphones.

The survey has three parts. You will be entitled to £2 incentive after finishing each of the first two parts. When finishing the third part you will be entitled to an additional 1£ and you will be entered to a prize draw of 5 of 30£ vouchers. Incentives will be provided as Amazon Vouchers.

This is a non-commercial research and the results will be available to the public following an Open Access policy.

Your name and email will be treated strictly confidential and will only be used to contact you if you win one of the Amazon vouchers or if we want to clarify some of your comments.

This research is conducted by Manal Aldhayan, a PhD candidate at Bournemouth University. For any further information, please contact me at maldhayan@bournemouth.ac.uk

Thank you again

Q1: Do you have a **wellbeing issue** you would like to improve, e.g. issues around sleeping, expenditure, stress, excessive usage of social media and games, etc.?

- " No [Please STOP the survey here] "Yes [Please list one or more in the text box]

-

Q2: What is the gender you identify yourself with?

" Male

" Female

" Prefer not to say

Q3: What is your age?

Q4: What is your main country?

Q5: How well do the following statements describe your personality?

I see myself as someone who...

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
is reserved	:	:	:	:	:
Is generally trusting	:	:	:	:	:
tends to be lazy	:	:	:	:	:
is relaxed, handles stress well	:	:	:	:	:
has few artistic interests	:	:	:	:	:
is outgoing, sociable	:	:	:	:	:
tends to find fault with others	:	:	:	:	:
does a thorough job	:	:	:	:	:
gets nervous easily	:	:	:	:	:
has an active imagination	:	:	:	:	:

Q6: Using the 1 to 5 scale below, please indicate how much each of the following statements reflects how you typically are:

	Not at all (1)	(2)	(3)	(4)	Very much (5)
I am good at resisting temptation
I have a hard time breaking bad habits
I am lazy
I say inappropriate things
I do certain things that are bad for me, if they are fun
I refuse things that are bad for me
I wish I had more self-discipline
People would say that I have iron self-discipline
Pleasure and fun sometimes keep me from getting work done
I have trouble concentrating
I am able to work effectively toward long-term goals
Sometimes I can't stop myself from doing something, even if I know it is wrong
I often act without thinking through all the alternatives

Q7: How do you see the usefulness of online peer support group as a method to help members in managing their wellbeing issues?

.. Very useful .. Useful .. Moderately useful .. Slightly useful .. Not at all useful

Q8: Would you like to join an online peer support group to help you manage a wellbeing issue?

.. Very likely .. Likely .. Unlikely .. Very unlikely

In this section of the survey, we will ask your opinion of facilities and features that you like to see in the online peer support group's platforms

Q9: Online peer support groups can provide comparisons and bench-marking to members. How do you consider the importance the following features in it?

	Very Important	Important	Moderately Important	Slightly Important	Not at all Important
Performance reports, e.g. charts and data on how I am progressing
How the group as a whole is performing, e.g. 90% of members have been successful in meeting goals at Level 1
Specific members performance, e.g. showing performance of members with similar profile and stage of the issue

Q10: Online peer support groups can be equipped with **performance reinforcement** function. How do you consider the importance of the following features in it?

	Very Important	Important	Moderately Important	Slightly Important	Not at all Important
Socially recognising good performance, e.g. badges based on self-progress	:	:	:	:	:
Recognising top performers, e.g. leader boards for weekly performance	:	:	:	:	:
Adjusting the score and level of members based on performance and interaction	:	:	:	:	:
Showing comparisons with other members performance	:	:	:	:	:
Banning members, temporarily or completely, e.g. when violating the group norms and disturbing others	:	:	:	:	:

Q11: How do you prefer the **performance tracking** to be implemented?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Self-report, i.e. members report about their own performance	:	:	:	:	:
Automated when possible, through sensors and computing devices.	:	:	:	:	:
Hybrid, i.e. based on both self-report and sensors	:	:	:	:	:
Peer reporting, i.e. when peer comment on other peers performance, e.g. on smoking or alcohol cessation	:	:	:	:	:

Q12: In terms of setting performance goals, I like:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
To set up goals by myself	:	:	:	:	:
The moderator involvement in setting goals for me	:	:	:	:	:
Collective goals, e.g. reducing total online gaming for the group by 20% this week	:	:	:	:	:
Short-term goals, e.g. daily or weekly goals	:	:	:	:	:

In this section of the survey, we will ask your opinion of feedback that you like to see in the online peer support groups platforms

Q13: In relation to performance feedback source, I like feedback coming from:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Peer members	:	:	:	:	:
Group moderator	:	:	:	:	:
Software, e.g. charts based on my stored data	:	:	:	:	:

Q14: In relation to the subject of the feedback, I like feedback on:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
How I am achieving short term goals	:	:	:	:	:
How I am achieving long term goals	:	:	:	:	:
How my current status compares with my status when I joined the group	::	::	::	::	::
How others are performing with their goals	::	::	::	::	::
How others current status compares with their status when they joined the group	::	::	::	::	::

Q15: In relation to **communicating the feedback**, I like to receive feedback via:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
One-to-one chat with moderator	:	:	:	:	:
Forum and group chat	:	:	:	:	:
Text-based communication	::	::	::	::	::
Audio-based communication	::	::	::	::	::
Non-verbal cues, e.g. emoji and change in the colour scheme	::	::	::	::	::
Text reports detailing my performance	::	::	::	::	::
Frequent messages, e.g. hourly or several times a day	::	::	::	::	::
Querying the software about performance and feedback when I like to do so	::	::	::	::	::
Automated software, i.e. automatically generated and communicated	::	::	::	::	::

Q16: In terms of the **tone** of the feedback, I like to receive feedback which

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Focuses on my positive side	:	:	:	:	:
Mentions both positive and negative sides	::	:	:	:	:
Has an encouraging tone	::	:	:	:	:
Factual and neutral, i.e. facts and numbers, with no tone in it	::	::	::	::	::

This is the last section of this part.

In this section of the survey, we will ask your opinion of membership and exit procedure that you like to see in the online peer support groups platforms

Q17: If you like to **join a peer support group**, which of these roles do you like to take?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Group Member, i.e. to participate in groups activities	:	:	:	:	:
Group Moderator, i.e. to coordinate and steer the group activities	:	:	:	:	:
Both roles, e.g. join as a member and moderate occasionally	::	::	::	::	::

Q18: In terms of membership criteria, a new member should have:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Friendship to some or all the group members	:	:	:	:	:
Similar demographics, e.g. age, gender, culture, etc.	:	:	:	:	:
Similarity in personality and profile, e.g. hobbies, values, communication style, etc	::	::	:	:	::
Recommendation by a member in the group	::	::	:	:	::
Similar wellbeing issue to other members	::	::	:	:	::
Similar level of severity of the wellbeing issue	::	::	:	:	::

Q19: In relation to leaving the group by certain members, please indicate your opinion of the following policies:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Members should declare in advance if they want to exit the group so others become prepared	:	:	:	:	:
Members who decide to leave the group spontaneously should give a reason to other members	:	::	:	:	:
Members who violate the group norms and mission should be forced to exit the group	::	::	::	::	::

Q20: Who should decide if a member can leave the group when achieving all his/her targets,? [please note that this may affect other members esteem]

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
The members themselves	:	:	:	:	:
The moderator	:	:	:	:	:
The software based on performance data	:	:	:	:	:

Q21: Who can decide if the member has to leave the group when he/she violates the group rules and mission?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
The moderator	:	:	:	:	:
The software based on data and reports about performance and group interaction	:	:	:	:	:
Group vote, based on a recommendation by some members	:	:	:	:	:
Group vote, based on a recommendation by the moderator	:	:	:	:	:

You are now entitled for 2£.

In order to get another £2 please complete the next survey.



Online peer support groups are typically **moderated**. This section is going to ask you about the role of **moderator** in them.

Q22: In terms of the nature of the moderator; I want the moderator to be:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Software, e.g. automatic target calculation and advice giving.	:	:	:	:	:
Human	:	:	:	:	:
Blended, i.e. human and software together	:	:	:	:	:

Q23: In terms of the strategy of allocating a human moderator, the allocation should be based on:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Voting by members	:	:	:	:	:
Experience, e.g. in group management, counselling, previous success, etc.	:	:	:	:	:
Rota-based, i.e. each member becomes a moderator at some stage	:	:	:	:	:
Performance, e.g. being a helper to others, enhancing personal wellbeing score, etc.	:	:	:	:	:

Q24: In terms of the skills a moderator should have, the moderator should have:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Had the well-being issue themselves in the past and recovered from it	:	:	:	:	:
Knowledge, e.g. behavioural change, management and leadership skills	:	:	:	:	:
High communication skills (verbal and non-verbal, diplomacy, motivating language, etc.)	:	:	:	:	:

Q25: In terms of the responsibility and permission of the moderator to monitor group members, the moderator should be able to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Access the data about members performance, e.g. achievement of goals and progress made towards them	:	:	:	:	:
Access data around the style of communication of members, e.g. reports indicating members to be helpful, distractor, digression, etc.	:	:	:	:	:

Q26: In terms of the **moderator authority**, the moderator should be able to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Manage membership, e.g. adding new members and banning members who violate the rules, etc.	:	:	:	:	:
Ban members from certain activities, e.g. banning video games and certain food at night hours, etc.	:	:	:	:	:
Set up the online environment, e.g. the colours, the forum topics, the sounds, the reminders, etc.	:	:	:	:	:

Q27: In relation to the responsibility and permission of **the moderator to issue rewards and penalty to members**, the moderator should be able to issue:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Rewards to members based on the improvement of their performance	:	:	:	:	:
Rewards based on the member's interactions within the online group, e.g. helping others, etc.	:	:	:	:	:
Penalty based on the poor performance.	:	:	:	:	:
Penalty based on the member interactions within the online group, e.g. distracting others, carelessness, etc.	:	:	:	:	:

Q28: In terms of the responsibility and permission of **the moderator to manage performance goals**, the moderator should be able to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Specify performance goals for members	:	:	:	:	:
Modify goals for members, e.g. grant an extension	:	:	:	:	:
Review goal achievement with members frequently	:	:	:	:	:
Discuss barriers to goals achievement with members, e.g. resolving conflicting goals.	:	:	:	:	:
Send personalised best practices and advice on how to achieve goals to members	:	:	:	:	:

Q29: In terms of the responsibility and permission of the **moderator to provide feedback** to members, the moderator should be able to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Send feedback about how the group is performing as a whole, i.e. collectively	:	:	:	:	:
Send feedback about self-progress to members, e.g. their self-improvement	:	:	:	:	:
Send feedback to members about their interaction, e.g. being seen as a helper or distractor	:	:	:	:	:
Choose the communication channel to use with members, e.g. text, audio, non-verbal such as emoji, chat, etc.	:	:	:	:	:
Choose the framing and the tone of the feedback, e.g. guidance, assertive, strict, friendly, etc.	:	:	:	:	:

Q30: Which of these do you like to restrict their visibility from other members in the group?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
My profile data	:	:	:	:	:
My performance data (e.g., progress and rewards)
Feedback I received, e.g. from moderator, software, peers
None of the above; it is a support group

Thank you for completing the first survey. You are now entitled for £4. In order to get another £1 and entered to the prize draw please complete the next survey, otherwise you can Stop the survey here and get the £4 only.

In this last section, we will ask about factors which affect your acceptance and rejection of online peer support groups.

Q31: Online peer support groups method is seen by some as an auxiliary mechanism to ease and add more engagement to the management of the wellbeing issue. Accordingly, the following

features will increase my **acceptance** of them:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Awards when achieving behavioural targets, e.g. points, badges, etc.
Awards when making progress towards the behavioural target
Information and graphs how I am progressing to keep me engaged
Peer comparisons, i.e. see how I and others are performing

Q32 Online peer support groups method is seen by some as **a prevention and precautionary mechanism** when the wellbeing issue starts to emerge. Accordingly, the following features will

increase

my **acceptance** of

them:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Guidance, feedback and information sent by moderators based on performance and achieving wellbeing goals	::	::	::	::	::
Steps, restrictions and plans set by an authorised moderators, e.g. game usage limit for compulsive gamers	::	::	::	::	::
Feedback messages sent by peers about performance and wellbeing goals	::	::	::	::	::

Q33: Online peer groups method is seen by some as an **awareness tool** to help raise awareness and knowledge about the wellbeing issue and level of the problem. Accordingly, the following features will increase my **acceptance** of them:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Self-Monitoring, e.g. showing your hourly, daily and weekly performance and progress indicator	::	::	::	::	::
Peer comparisons, e.g. comparing you to other members in the group who have similar profile and level of problem.	::	::	::	::	::
Awareness on goal setting, e.g. how to set and achieve goals, and how to avoid deviation from the plan you sat to achieve them	::	::	::	::	::

Q34: Online peer support group method is seen by some as an **educational platform** to learn how to regulate the wellbeing issue and change behaviour.

Accordingly, I **accept** the method when it is an:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Environment to learn how to set up achievable and effective goals and their plans	:	:	:	:	:
Environment to learn from a peers, e.g., by sharing real-life stories and successful strategies around the wellbeing issue.	::	::	::	::	::
Environment to learn from experienced moderators, e.g. best practice around the wellbeing issue.	::	::	::	::	::
Environment where I can learn through acting as a mentor, i.e. when advising other members and when having to moderate the group	::	::	::	::	::

Q35: Online peer support groups method is seen by some as **a support tool** to guide, motivate and encourage the recovery processes of the wellbeing issue. Accordingly, I **accept** online peer groups as an:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Environment to provide emotional support, e.g. when struggling to follow the healthy behaviour.
Environment to suggest alternative activities to replace and distance myself from the negative behaviours and enhance wellbeing
Environment to get positive and motivational feedback when performing well
Environment to get positive and motivational feedback even when failing to achieve targets
Environment to issue warning feedback when members performance and interaction are not right
Environment to provide experienced moderators who are able to provide advice and guide
<p>Peer group can be rejected for different reasons. This section will ask few questions on why you may reject them.</p>					

Q36: Peer group is rejected when seen as a medium for **a loose and unmanaged interaction.**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I reject a group with a weak moderator, e.g. unable to stop or ban members who are not adhering to the group norms	:	:	:	:	:
I reject a group which allows a loose and relaxed rules e.g. accepting conversations and interactions that are not related to the wellbeing issue	:	:	:	:	:
I reject a group with a large size as it may not feel as a coherent group	:	:	:	:	:

Q37: Online peer groups method is rejected by some as it can be **intimidating if** used in certain modalities.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I reject a group with harsh penalties e.g. banning from the group for a period of time if I repetitively forget my target	:	:	:	:	:
I reject a group with negative feedback, e.g. you have repetitively failed in achieving your target, this is the 5th time this month	:	:	:	:	:
I reject a group with harsh feedback, e.g. Your interaction with peers shows anti-social and disruptive patterns. You have been reported for annoying others.	:	:	:	:	:

Q38: Online peer groups method is rejected by some when seen as overly judgmental.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I reject a group if I am judged by peers who are only online contact, e.g. not real-life contacts
I reject a group if I am judged by online peers who are also real-world contacts
I reject a group if the judgement online expands to other life aspects by peers who are real-world contacts
I reject a group if the group moderator judges my performance and interaction frequently, even if this is for my benefit

Q39: Online peer support group method is rejected when the membership protocol is unclear. Please indicate your opinion of the following:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I reject a group which allows friends in real-life to join
I reject a group which allows family members to join
I reject a group when members can leave the group anytime without giving notice and explanation
I reject a group when there are conditions to exit the group, e.g. to tell the moderator in advance

Document 1 :**Part A: Introduction****What is peer support group?**

Peer support is referred to as when individuals are gathered with others who share the same problem and experience to participate in activities that include mutual support and social emotional support to enhance psycho-social well-being and re-merge them into their societies. The participants in addictive behaviour groups about social involvement and interactions under the direction and guidance of addiction consultants to reduce any other addictive behaviour that might arise.

Peer groups are subdivided into two categories, i.e. treatment groups and task groups. Treatment groups adopt an open style of communication with a high frequency of self-disclosure discussions. The process of interaction helps shape the roles of the different group members. Treatment groups can adopt either fixable or formal, and progress is measured to achieve the stated treatment goals.

In contrast, task groups are associated with relatively low self-disclosure levels and adopt a structured communication style. The members of task groups often have roles assigned, and the procedural approach is considerably more formal. Furthermore, achievements are measured in terms of whether or not tasks are accomplished. Specific steps can be taken to enhance peer groups' effectiveness, including addressing aspects such as patterns of interaction, group homogeneity, goal setting, group dynamics, and sustainability.

What is online peer support group?

Online peer support group approach is different from face-to-face peer groups. Online peer groups typically occur in relatively unrestricted environments, which encourages the participants to volunteer greater disclosure. The ability to form peer groups online is especially beneficial when operating in remote settings where it may not be feasible for the participants to travel to meet face-to-face.

Social software can be used to enable online peer groups. This process often relies on surveillance to impose social pressure to help deliver the desired behaviour. Online peer groups for digital addiction can be designed in such a way that they combine attributes of task groups and treatment groups.

How a peer group functions can be influenced by various dimensions of the group dynamic, including the group's size, group cohesion, goal setting, interaction patterns, social integration, and group culture. To be made with treatment programmes, it is necessary to truly understand

group dynamics and their impact on online peer groups. This is important because what has been shown to work well in face-to-face peer groups may be ineffective in an online setting. For instance, the free-floating approach, whereby the group members share the moderators' roles, may be unworkable. Therefore, new forms of addictive processes, behaviours and tools could all affect how the group performs. It may be necessary to adopt specific decision-making processes in the groups whereby the therapist or some other non-addict is invited to decide whether the interactions that have been suggested should be adopted.

Online Peer Support Groups can be designed to combat and correct digital addiction. For example, people can join such groups to get help and support from each other and from moderators so that they become more aware and more in control of issues around obsessive social media, online games, etc. Our aim is to develop principles and methods for developing online platforms to host peer support groups so that people can join and participate remotely and through their computers of smartphones.

Part B: Scenarios

Scenario 1 - Emily the Twitter User

Emily is a company worker and 28-years-old. She spends many hours on social media especially Twitter and her digital media usage developed to be excessive usage behaviour. She spends a lot of time-sharing Tweets, commenting and liking Tweets. She has more than ten thousand followers on Twitter. she spends most of her time tweeting and replying to her followers. Emily describes her primary motivations as online companionship and self-expression. However, Emily has pointed that she has preoccupation issues even when doing normal household chores. Emily often feels that she cannot control her usage and always feels guilty as it affects her job performance, and she is hardly spending any time with her family. Also, her habitual checking of twitter and digital media has affected her sleeping pattern. She has very few friends in real life and rarely hangs out with them.

Scenario 2: Katie the Instagram and Snapchat User

Katie is a university student and 21-years-old, she spends most of her time on the Instagram and Snapchat. She uses Instagram to show and realise her identity by posting videos and photos and to share her daily activities by posting video on Snapchat. She spends too much time on Instagram and Snapchat, and she jumps from one application to another. Katie feels that switching off could lead to missing important events, such as the chance to see and comment on photos and videos which everyone is liking and commenting. She thinks that not reacting might leave her friends unhappy, negatively affects their relationship, and her online popularity might be reduced. She is always checking Instagram and Snapchat during seminars, lectures and even had to delay working on her assignments. Katie realised that her Instagram and Snapchat usage is getting in the way of her education. She is at risk of re-submitting some assignments or

resitting the entire year. Also, her behaviour is affecting other aspects of her life, i.e. skipping or missing meals, and she grabs and eats anything available on the go. Katie spends most of her time in the virtual world to the extent that she neglects essential things in the physical world, such as her in-person social interaction. Katie tries without success to control her presence on Instagram and Snapchat.

Scenario 3: Sara the Facebook User

Sara is a 25-year-old. She has a PhD degree and now works as a Lecturer. Sara began to use Facebook a lot two years ago. She joined Facebook groups with her close friends and colleagues’ who were already use Facebook. Sara began to develop an too much Facebook usage habit after she Covid-19 pandemic. In order to assist keep in close contact with her friends, Sara spends huge amounts of time chatting, reading and replying to messages, creating status updates, checking and responding to contacts status updates. Sara feels anxiety and aloneness when she is online with her friends. Sara stayed awake till the early morning using Facebook. Therefore, she finds it very hard to wake up early and get to work on time. Her performance on the job is adversely affected, and she is in the habit of missing key deadlines. Sara has gotten unwritten warning notices from her boss for coming to work late and calling in sick and tired on several occasions over the last few months. Her employer's warning is a particular trigger that has led Sara to start thinking of doing something about Facebook usage.

Part C: Mobile applications available in the market to help track digital media usage

- 1- Quality-time is mobile application which helps track smartphone usage activities, Figure 1 show the app features.

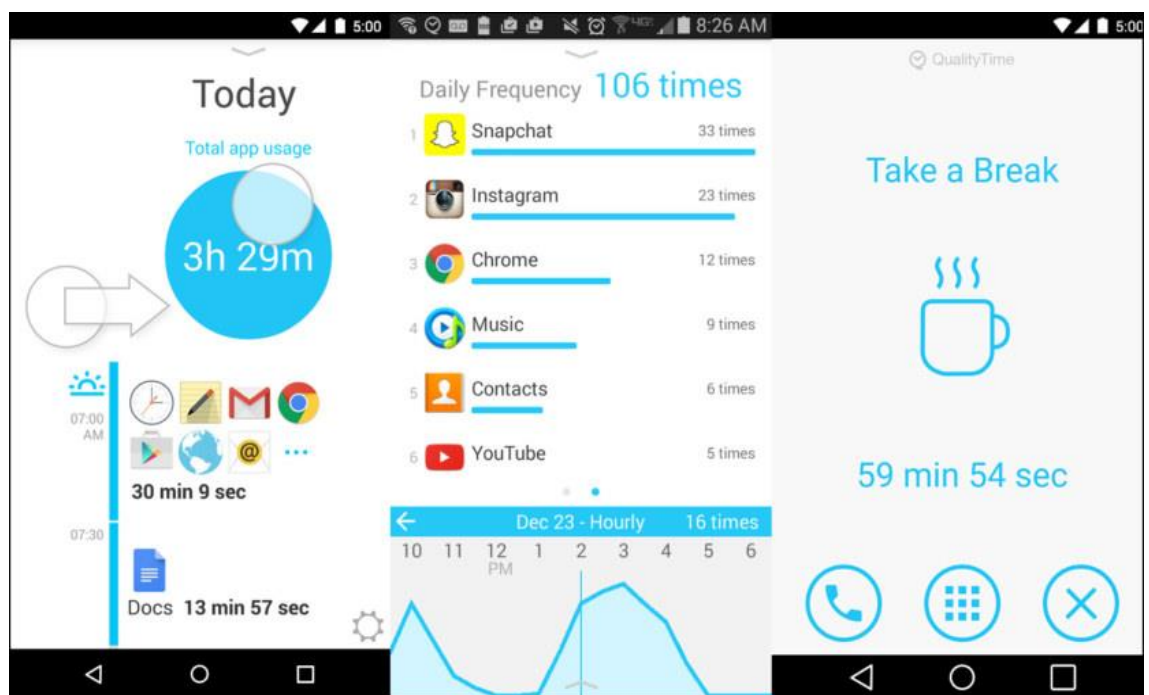


FIGURE 1: QUALITY-TIME MOBILE APP

- 2- Off time tracking mobile app is use to lock the smartphone and limit the digital media daily usage, Figure 2 shows the app features.

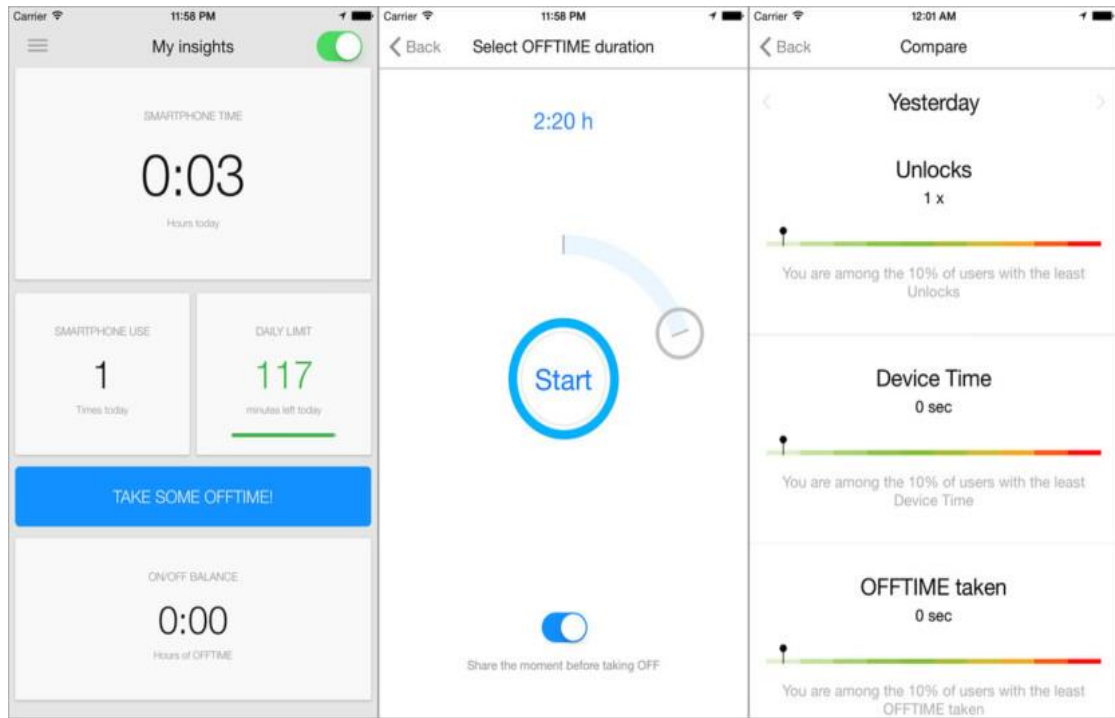


FIGURE 3 OFF TIME TRACKING MOBILE APP

- 3- Moment mobile app auto tracks the digital media application usage time, Figure 3 shows the app features.

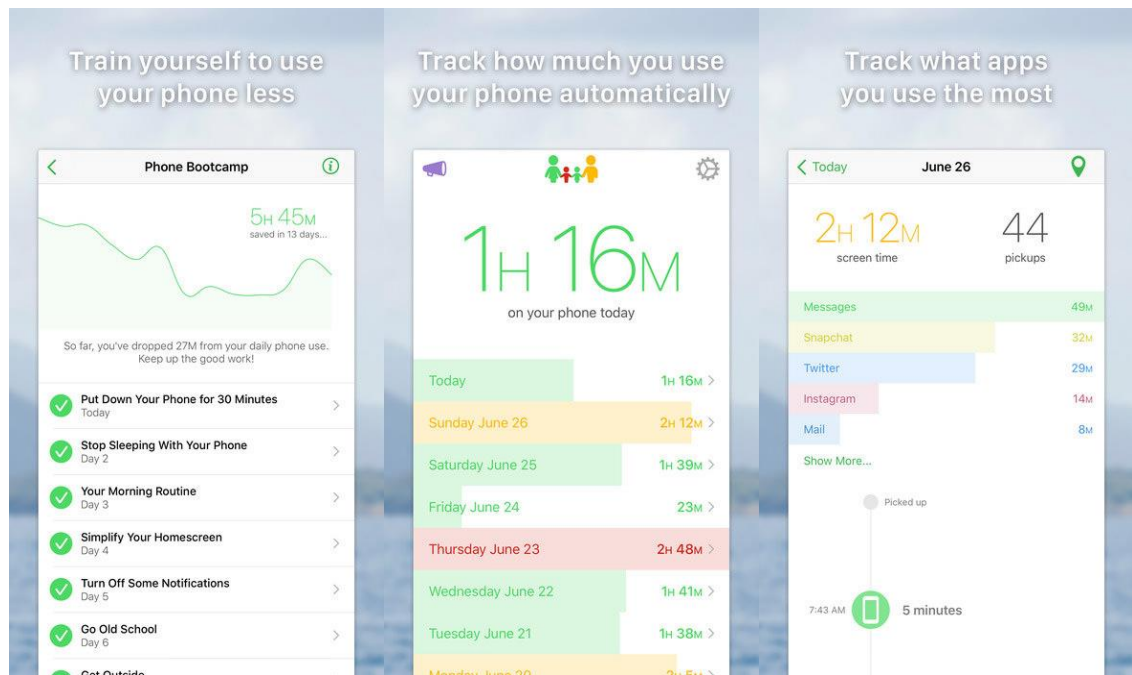


FIGURE 3 MOMENT MOBILE APP

Part D: Acceptance factors definitions

Acceptance Factors	Descriptions
Entertainment Factors	The online peer group applied entertainment tools such as include gaming elements which are implemented and adapted as a points, level and leader board, etc.
Educational Factors	The online peer groups should be an educational platform which provide functionalities that would help them learn how to control digital media usage and find life alternatives
Support tools	The online peer group should be designed to be support tool and provide support and to encourage users to change their behaviour and attitude.
Awareness tools	To help raising user's awareness of the digital media consumption and should be a tool for sharing knowledge and experience between users
Prevention tools	Design the online peer support groups to be prevention of digital addiction and used some tools which help.

Part E: Variabilities features examples

- Set digital media usage goals that could involve some features, for example, source of goals, and goal types.
- Feedback is information about user's performance of a target, goals, etc. which is used as a basis for improvement. Feedback could involve feedback source, feedback timing, feedback framing.
- Monitor system is use to track digital media usage, the monitor could be self-monitoring, peer monitoring and automated.
- Group moderator is a person who is expected to lead, guide and provide knowledge.
- Peer is a person who shares similar behavioural issues and experience.
- Helper is a peer who supports other peers and encourage a positive behaviour.
- Recovery is a peer who can be described clinically as recovered.
- Disrupting is a peer who tends to prevent the continuity of group work.

Document 2 :

Part A: Questions for design the online peer group by using user centred design.

1. What are the factors that would motivate you to join an online peer group?
2. What are the factors that would make you reject the online peer support group?
3. What goals do you require to be in the group?
4. What types of goals do you prefer?
5. Do you require the online peer group to have comparison and feedback features? If yes, what types of comparison, feedback source, feedback subject and feedback tone do you prefer?
6. What membership and exit procedure features you require for the online peer group?
7. What privacy features do you require for the online peer group?
8. What moderator authority features do you require for the online peer group?
9. What are the strategies to allocate the moderator in the online peer group?
10. What are the reinforcement functions that the moderator can provide in the online peer group?
11. What are the skills that the group moderator should have?
12. What is the nature of the moderator? e.g. human, intelligent, etc.
13. Do you accept the moderator to monitor the group? If yes, what can the moderator monitor?
14. Do you accept the moderator to provide feedback to the group members? If yes, what feedback type do you prefer?

Document3: The templates for the useful of the acceptance factors the online peer group

Part A: Entertainment mechanism:

		Dialogue
Template ID: 1		Acceptance Factors
Acceptance Factor F1: Entertainment mechanism		
What entertainment features would increase your acceptance to join online peer group?		
Award as entertainment		
<input type="checkbox"/> Awards when achieving behavioural targets (e.g., points, badges, etc.). <input type="checkbox"/> Awards when making progress towards the behavioural target. <input type="checkbox"/> Penalty (e.g., reduce point, reduce levels, etc.) <input type="checkbox"/> Gamification mechanism on how I am progressing to keep user engage (e.g., progress bar, leader boards, badges. Points, etc.). <input type="checkbox"/> Others (Please Specify)		
Elaborate on why the selected features would increase entertainment and the reason of increasing your acceptance of online peer group?		
Selected features	Reason	
Peer comparison as entertainment		
<input type="checkbox"/> Peer comparisons, i.e. see how I and others are performing. <input type="checkbox"/> Peer comparison should be competitive between group members i.e. there are winner and loser members. <input type="checkbox"/> Compare progress with members who has similar level of digital media usage. <input type="checkbox"/> Peer comparisons, i.e. see how I and others are performing <input type="checkbox"/> Peer comparisons based on group goals and target i.e. see how I and others are performing toward group goals and targets. <input type="checkbox"/> Other (please specify)		
Elaborate on why the selected features would increase entertainment and your acceptance of online peer group?		
Selected features	Reason	
Goal achievement as entertainment		

- The goals should be set as an achievable goal.
 - The goals should have more than one target.
 - The group should have monitor system to monitor members achievement toward the target goals.
 - The system should provide rewards such as “points” based on goals achievement.
 - Group members should set up the goals and target.
 - Other (please specify)
-

Elaborate on why the selected features would increase entertainment and your acceptance of online peer group?

Selected features	Reason

Part B: Awareness tools

Dialogue

Acceptance Factor F2: Awareness tools

What awareness features would increase and motivate your acceptance of the online peer group?

Self-awareness

- Self-monitoring e.g., showing your hourly, daily and weekly.
- Provide frequency of the pop-up warning feedback to raise awareness regarding digital media usage.
- Group moderators provide feedback to influence and raise awareness of usage digital media.
- Group moderator or the platform send a weekly report which include user average usage and the level of addiction.
- Other (please specify)

Elaborate on why the selected features would increase self-awareness and your acceptance of online peer group?

Selected features	Reason

Peer comparison as an awareness

- Peer comparisons, e.g. comparing you to other members in the group who have similar profile and level of problem.
- Peer comparison feedback e.g. feedback based on comparing you to other members goal achievement.

Other (please specify)

.....

Elaborate on why the selected features would increase your awareness of peer comparison?

Selected features	Reason

Achievement goals

- Goal achievement i.e. achieve goal would help users to be aware of their progress towards targets and level of control of the digital media usage.
- Difficulty to achieve proximal goals would lead to raise members awareness of the problematic using digital media.
- Group moderator send a notification messages to raise awareness of the using digital media.
- Group moderator would block the digital media apps for certain times for the user who exceeds the digital media usage limits.
- Awareness on goal setting, e.g. how to set and achieve goals, and how to avoid deviation from the plan you sat to achieve them.
- Other (please specify)... ..

Elaborate on why the selected features would increase your goal achievement and your acceptance of online peer group?

Selected Features	Reason

Part C: Educational tools

Dialogue

Acceptance Factor F3: Educational tools

What are the educational features that would increase and motivate user to acceptance online peer group?

Peer learning

- Environment to learn from a peer, e.g., by sharing knowledge and experiences.
- Environment to learn from peers how they successfully achieve the group goals (e.g. asking questions and receive advice regarding how they reduce usage).

- Environment to learn from a peer, e.g., by sharing real-life stories and successful strategies around the control of digital media usage.
- Other (please specify).....

Elaborate on why the selected features would increase your acceptance of online peer group

selected features	Reason

Moderator role

- Environment to learn from experienced moderators, e.g. best practice around the social media issue.
- Environment to learn from moderator leadership role, such as learn from moderator guidance feedback and manage the group.
- Environment where I can learn through acting as a mentor, i.e. when advising other members and when having to moderate the group.
- Other (please specify)

Elaborate on why the selected features would increase your acceptance of online peer group

selected features	Reason

Set up goals

- Environment to learn how to set up achievable and effective goals and their plans.
 - Environment to learn from moderator how to set up and review the goals.
 - Environment to learn from moderator or peers how to set up achievable and realistic goals.
 - Other (please specify)
-

Elaborate on why the selected features would increase your acceptance of online peer group

selected features	Reason

Part D: Prevention tools

Dialogue

Acceptance Factor F4: Prevention tools

What are the prevention tools that would increase and motivate user to acceptance online peer group?

Moderator feedback

- Feedback message sent by the moderator about performance and adherence to the goals.
- advice and guidance feedback send by the moderator, the feedback based on monitor group members' performance and progress.
- Moderators send restriction feedback and warning to lock some digital media application.
- Group moderator send supportive information to peers struggles to achieve the goals.
- Group moderator sends motivational and positive feedback to members who achieve progress.
- Group moderator provides warning, strict, formal and in order feedback to members who does not adhere to group rules and goals target.
- Other (please specify)

Elaborate on why the selected features would increase your acceptance of online peer group

Selected features	Reason

Peer feedback

- Feedback messages sent by peers about performance and information to help user to improve performance.
- Peer feedback context should be motivational and have some encouragement tones.
- Other (please specify).....

Elaborate on why the selected features would increase your acceptance of online peer group

Selected features	Reason

Part E: Support tools

Dialogue

Acceptance Factor F5: Support tools

What are the support tools that would increase and motivate users to acceptance online peer group?

Provide advice

- Environment to have intelligent system, the system sends a feedback based on the tracking and monitoring user usage, compare user progress with self-pass progress.
- Environment to provide experienced moderators who are able to provide advice and guide members to manage the digital media usage.
- Environment to get positive and motivational feedback from peers.
- Other (please specify).....

Elaborate on why the selected features would increase your acceptance of online peer group

Selected features	Reason

Feedback

- Environment for peers to feel safe to talk about things that are most affect them when they reduce the digital media usage.
- Environment to get positive and motivational feedback even when failing to achieve targets.
- Environment to suggest alternative activities to replace and distance myself from the negative behaviours and enhance control using digital media.
- Environment to get positive and motivational feedback when performing well.
- Environment to issue warning feedback when members performance and interaction are not right.
- Environment to receive a motivational and positive feedback from peer feedback required to be
- Environment to provide emotional support, e.g. when struggling to follow the healthy behaviour.
- Other (please specify).....

Elaborate on why the selected features would increase your acceptance of online peer group

Selected features	Reason

Template ID: 2 **Rejection Factors**

Rejection Factors R1: Intimidation

What are the intimidation tools would you reject it in the online peer group?

- Harsh Penalty (i.e. block from group if the user could not achieve the group goals or target, write member name who does not achieve the goals target in the main page of the platform.
- Negative feedback (i.e. use harsh language) e.g. you have repetitively failed in achieving your target, this is the 5th time this month.
- Harsh feedback, e.g. Your interaction with peers shows anti-social and disruptive patterns. You have been reported for annoying others.
- Other (please specify).....

Elaborate on why the selected features could make you reject the online peer support group

Selected features	Reason

Rejection Factors R2: Overly judgment

What types of judgements would you reject in the online peer group?

- Reject a group if the group moderator judges my performance and interaction frequently (i.e the moderator overly judge member who exceed the usage target).
- I reject a group if the judgement online expands to other life aspects by peers who are real-world contacts.
- Reject a group if I am judge by peers who are only online contact, e.g. not real-life contacts.
- Reject a group if I am judge by online peers who are also real-world contacts.
- Other (please specify).....

Elaborate on why the Selected features could make you reject the online peer support group

Selected features	Reason

Rejection Factor R3: Unmanaged interactions and unclear membership.	
Peer group is rejected when seen as a medium for unmanaged interaction and unclear membership.	
<i>The following features rejected:</i>	
What are the membership and interaction, you reject would in the online peer group?	
<input type="checkbox"/> <input type="checkbox"/> Weak management i.e moderator e.g. unable to stop or ban members who are not adhering to the group norms <input type="checkbox"/> <input type="checkbox"/> Weak moderator which allows loose and relaxed rules e.g. accepting conversations and interactions that are not related to the digital media issue <input type="checkbox"/> <input type="checkbox"/> large group size as it may not feel as a coherent group and members find it difficult to focus on the group goals. <input type="checkbox"/> <input type="checkbox"/> reject the group members is unknowing people. <input type="checkbox"/> <input type="checkbox"/> reject the group members profile to have real name and pictures. <input type="checkbox"/> <input type="checkbox"/> reject a group when there are conditions to exit the group, e.g. to tell the moderator in advance. <input type="checkbox"/> <input type="checkbox"/> reject a group when members can leave the group anytime without giving notice and explanation. <input type="checkbox"/> <input type="checkbox"/> Other (please specify).....	
Elaborate on why the selected features could make you reject the online peer support group	
Selected features	Reason

Document 5: Configure the online peer group design features

Part A: Group Moderator Features

Dialogue	
Template ID: 3	Moderator Role
In terms of the nature of the moderator; what is the nature of moderator you prefer	
<input type="checkbox"/> Software, e.g. automatic target calculation and giving advice. <input type="checkbox"/> Human <input type="checkbox"/> Blended, i.e. human and software together	
In terms of moderator authority in the online peer group, what kinds of authority would you like the group moderator to have?	
<input type="checkbox"/> Manage membership, e.g. adding new members and banning members who violate the rules, etc. <input type="checkbox"/> Ban members from certain activities, e.g. banning video games and certain food at night hours, etc.	

Set up the online environment, e.g. the colours, the forum topics, the sounds, the reminders, etc.

Nature of Moderator	Authority	When to apply
---------------------	-----------	---------------

In terms of the moderator responsibility to issue rewards and penalty, what type of reinforcement function you would like the group moderator to issue.

- Rewards to members based on the improvement of their performance.
- Rewards based on the member's interactions within the online group, e.g. helping others, etc.
- Penalty based on the poor performance.
- Penalty based on the member interactions within the online group, e.g. distracting others, carelessness, etc.

In terms of the skills, what moderator skills should the moderator have?

- Had the well-being issue themselves in the past and recovered from it.
- Experience in the domain, e.g. behavioural change, management and leadership skills.
- High communication skills (verbal and non-verbal, diplomacy, motivating language, etc.).

In terms of the strategy of allocating a human moderator, what strategy would you like to allocate moderator.

- Voting by members.
- Experience, e.g. in group management, counselling, previous success, etc.
- Rota-based, i.e. each member becomes a moderator at some stage.
- Performance, e.g. being helper to others, enhancing personal digital media score, etc.

Strategy of allocating moderator	skills	When to apply
----------------------------------	--------	---------------

Voting by members
Experience
Rota-based
Performance

In terms of monitoring system, what type of monitor you should the moderator

- Access the data about members performance, e.g. achievement of goals and progress made towards them.
- Access data around the style of communication of members, e.g. reports indicating members to be helpful, distractor, digression, etc.

Is there any additional information that you think should be considered here?

.....
.....

.....

Template ID: 3.1	Moderator Tasks
In terms of the responsibility of the moderator to manage performance goals, what type of goals would you like the group moderator to set up and help with	
<input type="checkbox"/> Specify performance goals for members. <input type="checkbox"/> Review goal achievement with members frequently. <input type="checkbox"/> Modify goals for members, e.g. grant extension. <input type="checkbox"/> Discuss barriers to goals achievement with members, e.g. resolving conflicting goals. <input type="checkbox"/> Send personalised best practices and advice on how to achieve goals to members.	
Strategy of allocating moderator Voting by members Experience Rota-based Performance	Goal setting When to apply
In terms of the responsibility of the moderator to provide feedback to members, what feedback would you like the moderator to provide	
<input type="checkbox"/> Feedback about how the group is performing as a whole, i.e. collectively. <input type="checkbox"/> Feedback about self-progress to members, e.g. their self-improvement. <input type="checkbox"/> Feedback to members about their interaction, e.g. being seen as a helper or distractor. <input type="checkbox"/> Moderator can choose the communication channel to use with members, e.g. text, audio, non-verbal such as emoji, chat, etc. .. Moderator can choose the framing and the tone of the feedback, e.g. guidance, assertive, strict, friendly, etc.	
Strategy of allocating moderator Voting by members Experience Rota-based Performance	Feedback When to apply
In terms of the responsibility and permission of the moderator to monitor group members, the moderator should be able to:	
<input type="checkbox"/> moderator able to access the data about members performance, e.g. achievement of goals and progress made towards them.	

moderator able to access data around the style of communication of members, e.g. reports indicating members to be helpful, distractor, digression, etc.

Is there any additional information that you think should be considered here?

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.....

.....

Part B: Goals setting

	Dialogue																
Template ID4:	Setting Behaviour Goals																
What behaviour targets would you like to set to help you manage your problematic digital media usage?																	
<p>Behavioural Goals (order by priority), e.g. for a student, goals that might help reduce my procrastination on Instagram may be on top of the list.</p> <p>G1.</p> <p>.....</p> <p>.....</p> <p>G2.</p> <p>.....</p> <p>.....</p> <p>G3.</p> <p>.....</p> <p>.....</p> <p>G4.</p> <p>.....</p> <p>.....</p>																	
What the type of goals would you like to set to achieve your behavioural targets?																	
<p><input type="checkbox"/> Distal goals (goal set on a long-term basis)</p> <p><input type="checkbox"/> Proximal goals (goal set on a short-term basis)</p> <p><input type="checkbox"/> Goal specificity (the precision and granularity of what is to be achieved)</p>																	
I would prefer to set goals <source of your behavioural goals>																	
<p><input type="checkbox"/> Self-set</p> <p><input type="checkbox"/> Collective -set (group users who have profile similarity or <i>have of similarity level of problem</i>).</p> <p><input type="checkbox"/> Moderator -set</p>																	
What the reason for choice and the source of goals?																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Goal</th> <th style="width: 25%;">Source of goal</th> <th style="width: 25%;">Origin of problem</th> <th style="width: 25%;">Reason for choice</th> </tr> </thead> <tbody> <tr> <td>G1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>G2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>G3</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Goal	Source of goal	Origin of problem	Reason for choice	G1				G2				G3			
Goal	Source of goal	Origin of problem	Reason for choice														
G1																	
G2																	
G3																	

Part C: Monitoring and Privacy

Dialogue

Template ID: 5		Monitoring & Privacy	
I would like the software to help me achieve my goals by <i>(state your preferences around monitoring and comparison)</i>			
Monitoring progress made towards the goals			
<input type="checkbox"/> Self-monitoring <input type="checkbox"/> Peer-monitoring <input type="checkbox"/> Automated-monitoring <input type="checkbox"/> Blended approach			
Please provide details:			
Goal	Monitoring preference	Example when to apply	
G1			
G2			
G3			
G4			
In term of privacy, what do you think is needed to restrict visibility from other members in the group?			
<input type="checkbox"/> My profile data <input type="checkbox"/> My performance data (e.g., progress and rewards) <input type="checkbox"/> Feedback I received, e.g. from moderator, software, peers <input type="checkbox"/> I like to be open about all the above and to all, It is a support group			
Please provide details:			
Restrict visibility	Example when to apply		
V1			
V2			
V3			
V4			
Is there any additional information that you would like to be considered or you think is relevant?			
.....			
.....			
.....			
.....			

Part D: Comparing Behavioural Goals and Exit Procedure

Dialogue

Template ID: 6		Comparing Behavioural Goals and Exit Procedure	
Comparison of performance made towards the goals			
<input type="checkbox"/> Self-comparison <input type="checkbox"/> compare with specific members performance who has similar profile. <input type="checkbox"/> compare with specific members performance who has similar level of problem. <input type="checkbox"/> compare how the group as a whole is performing.			

Please provide details:		
Goal	Comparison Preference	Example when to apply
G1		
G2		
G3		
G4		
In relation to leaving the group by certain members, please select the conditions and criteria of leave the group		
<input type="checkbox"/> Members should declare in advance if they want to exit the group so others become prepared. <input type="checkbox"/> Members who decide to leave the group spontaneously should give a reason to other members. <input type="checkbox"/> Members who violate the group norms and mission should be forced to exit the group.		
When a group member achieves all his/her targets, who should decide if a member can leave the group		
<input type="checkbox"/> The members themselves. <input type="checkbox"/> The moderator. <input type="checkbox"/> The software based on performance data.		
Who can decide if the member should exit the group when he/she violates the group rules and mission?		
<input type="checkbox"/> The moderator. <input type="checkbox"/> The software based on data and reports about performance and group interaction. <input type="checkbox"/> Group vote, based on a recommendation by some members. <input type="checkbox"/> Group vote, based on a recommendation by the moderator.		
Please provide details:		
Exit reason	Decision making	Example when to apply
E1		
E2		
E3		
E4		
Is there any additional information that you would like to be considered or you think is relevant?		
.....		

Part E: Feedback features

Dialogue

Template ID: 7	Behavioural Goal Feedback
In relation to feedback on your progress and performance made towards your goal, where would you like the feedback to come from?	
<input type="checkbox"/> Peer members.	

Group Moderator.

Software e.g. charts based on my data.

In terms of feedback on your progress and performance made towards your goal, what feedback subject would you prefer? Feedback subject, i.e. the type of information included in the feedback

Proximal goal performance feedback i.e. (How I am achieving short term goals)

Distal goal performance feedback i.e. (How I am achieving long term goals)

Self-Past progress feedback i.e. (How my current status compares with my status when I joined the group)

Peer progress i.e. (How others are performing with their goals)

Peer-past progress i.e. (How others current status compares with their status when they joined the group)

Elaborate on when it should happen and how it should happen:

When

How

ELICITING FEEDBACK FRAMING

Dialogue

Template ID: 7.1 **Behavioural Goal Feedback Framing and tone**

Feedback framing and tone i.e. the language use in the message content of the feedback

Focuses on negative side

Focuses on positive side

Mention both positive and negative points

Feedback has an encouraging tone

Factual and neutral, i.e. facts and numbers, with no tone in it.

Elaborate on: When to implement, feedback messages tone and source of feedback

Feedback Framing	When to apply	Feedback Source
Focuses on negative side		
Focuses on positive side		
Positive and negative		
Encouraging tone		
Factual and neutral		

Is there any additional information that you think should be considered here?

.....

.....

.....

.....

ELICITING FEEDBACK TIMING

Dialogue

Template ID: 7.2 **Behavioural Goal Feedback Timing**

Feedback timing, i.e. the right timing of the feedback messages

- Feedback during the behaviour to notify the users about performance
- Feedback after exceeding the goals
- Automated software, i.e. automatically generated.
- Feedback frequent messages, e.g. hourly or several times a day
- Querying the software about performance and feedback when I like to do so

In relation to communicating methods of the feedback, how would you like to receive the feedback?

- One-to-one chat with moderator
- Forum and group chat
- Text Feedback
- Audio Feedback
- Non-verbal cues, e.g. emoji and change in the colour scheme
- Text reports detailing about performance

Elaborate on: feedback subject, source of feedback, frequency and methods of delivery feedback.

source	subject	Timing	communication methods

Is there any additional information that you think should be considered here?

.....

.....

.....

Part F: Reinforcement function and membership

Dialogue

Template ID: 8	Reinforcement function and membership criteria
In relation to reinforcement function, online peer support groups can be equipped with performance reinforcement function, which of the following reinforcement do you consider to be included in the group	
<ul style="list-style-type: none"> <input type="checkbox"/> Socially recognising good performance, e.g. badges based on self-progress <input type="checkbox"/> Recognising top performers, e.g. leader boards for weekly performance <input type="checkbox"/> Adjusting the score and level of members based on performance and interaction. <input type="checkbox"/> Showing comparison with other members performance <input type="checkbox"/> Banning members, temporarily or completely, e.g. when violating the group norms and disturbing others 	
Elaborate on when it should happen and how it should happen:	

In terms of membership criteria, what criteria of group members or a new member do you prefer

- Friendship to some or all the group members
- Similarity in personality profile, e.g. hobbies, values, communication style, etc
- Similar demographics, e.g. age, gender, culture, etc.
- Recommendation by a member in the group
- Similar digital media issue to other members
- Similar level of severity of the digital media

Document 6: Acceptance and rejection factors recommendation

Recommendation 1: Peer comparison features should be designed as entertainment and to raise awareness.

Users prefer the design of the peer comparison feature to be fun and have some element of entertainment function. The peer comparison feature is about comparing user goal achievement and progress that would help to raise user awareness about their problematic digital media usage. The system should compare a peer with group peers who have a similar level of problematic online behaviour. However, the system should avoid comparing peers who have similar achievement and goal progress.

- The system should provide anonymous information and details when presenting the comparison progress report.
- Comparing progress and achievement with peers who have a similar problem and share similar interests or occupation would help raise awareness. The system should persuade users who have low progress by using motivational language and avoid affecting their emotion.

Recommendation 2: Goal's achievement should be designed as an entertainment and to raise awareness.

The goal achievement feature should be designed to be fun by using some of the entertainment tools such as leaderboard, points and levels. Also, if a user cannot achieve or have difficulties to commit to the goals this would help raise awareness of their problematic digital media usage. However, if users face complex and conflicting goals, they should ask the group moderator to provide support.

- Peers should avoid conflicting and difficult goals. At the same time, the goals should not be easy.

Recommendation 3: Providing goal performance feedback

The group moderator and peers should provide advisable and judgemental feedback. The feedback should be regarding performance toward the goals, peer goal achievement with other group peers or interaction with other members. The feedback could be judgemental but not praise the user.

- Judgemental feedback may affect user emotion; therefore, the judgemental feedback may use motivational language.
- The feedback should be framed to encourage users to change their digital media usage and include advice and guidance.

Recommendation 4: Award and penalty

Users considered the award to be fun and an entertainment tool in the online peer group design. However, the award itself would not make the group fun and competitive, but the award and penalty would help achieve fun and entertainment. It would also encourage users to achieve group goals and be aware of their progress, whether good or slow.

- Avoid harsh penalty in the group because they may affect users emotionally. The award and penalty in the group should be reasonable.

Recommendation 5: *Democracy and harsh penalty*

The group moderator and management should manage the group to be democratic, e.g. members should not be forced to stay or leave the group. However, the group moderator should have the ability to ban members who violate the group rules or do not achieve any goal progress because this is not against the group democracy. The governance protocol here should be agreed upon by all group members.

- Temporarily or permanently, ban members who disrupt other members by sending annoying messages or feedback.
- The system should support the moderator to provide harsh penalties, such as temporarily or permanently banning members who do not achieve any goals progress as this is not against the democracy and weak management.

Recommendation 6: Trust between group members

The system should provide a high level of privacy and trust. If the group members are unknowing (i.e. strangers) peers, some features could be against privacy, affecting trust between members. For example, sharing goals achievement, comparing progress, receiving feedback from peers and sharing stories, knowledge, and experience. However, sharing

information with strangers would affect trust; thus, members might be sceptical about sharing their stories and experience.

- Avoid joining a group with strangers and share stories, knowledge, feedback, and goals with them.
- Avoid allowing member to join the group with completely anonymous profile

Document 7: Design guidelines of the variabilities features of the online peer group

Guideline 1: Allocate moderator based on rota strategy

If the strategy for allocating group moderator is designed to be rotated between group members, some functions are excluded and hindered by the rota-based-moderator. The rota based *exclude* function is:

- Provide feedback based on members performance and progress toward the goals.

The moderator functions will be **hindered** from the rota-based moderator because the group should have a high level of privacy and prevent group peers from accessing other members goal performance and interactions. The features *hindered* from the rota-based-moderator are:

- Ban a member who does not achieve any progress.
- Provide penalty-based goal performance.
- Send warning feedback to users who have low progress.

Guideline 2: Allocate moderator strategy based on experience

In order to allocate a moderator based on experience, the moderator skills function is required, i.e. domain experience, management leadership and communication skills.

Guideline 3: Monitoring system function

The monitoring system functionality monitors group members' goals achievement, goal progress and interaction. The functions that *require* the monitoring system function are:

- Reinforcement function (reward and penalty) based on member interaction and performance by the group moderator.

- Tracking user performance.
- Feedback provided by the moderator regarding the member's progress, achievement towards the goals, and member's interaction.
- Review and modify the individual or collective member goals.
- Lock application or ban members who violate the group rules or distracts other members.
- Privacy and users should decide what data should be revealed from their profile and their performance visibility.

Guideline 4: Comparison function

The comparison function compares member performance with past performance, group member performance, and specific members with other members. The functions that require the comparison function are:

- Reinforcement function.
- Feedback regarding the performance and goals achievement.
- Privacy and the users should decide who can see their performance, i.e. the moderator or both moderator and peers.
- The comparison function for comparing user self-past performance, group member performance or specific member performance.
- Ban member based on comparing member to their self-past performance or group member performance.

Guideline 5: Several features support the moderator authority

In order for the moderator to ban member, add member, or lock application they need support from other functions. The functions that support the moderator are:

- Having the exit procedure to supports the reinforcement functionality that enables the moderator to ban a member based on absence or goal progress or interaction within the group.
- Having the membership criteria to supports membership functionality that enables the moderator to add a new member.
- Having the reinforcement to supports the reinforcement functionality that enables the moderator to provide a penalty.
- Having the monitoring system to supports the tracking system functionality that enables the moderator to track members goals performance.

Guideline 6: Several features support the reinforcement function

In order for the moderator to provide reward and penalty they need support from other functions. The functions that support the moderator are:

- Having the monitoring system to supports monitor goal achievement functionality that enables the moderator to monitor members goal achievement and provide reward and penalty based on goal achievement and improvement.
- Comparing member progress functionality supports the functionality that enables the moderator to provide penalty and reward based on comparing member self-past performance, group member performance and specific member performance.

Guideline 7: Goal setting

For the moderator to set or review the group members goals, they need support from the moderator skills function.

- Having the moderator skills to supports the functionality that enables the moderator who has experience in the domain to set specific goals, review the goals, discuss goals attainment, and modify the goal attainment plan.