Building Online Platforms for Peer Support Groups as a Persuasive Behavior Change Technique

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Abstract. Online peer group approach is inherently a persuasive technique as it is centered on peer pressure and surveillance. They are persuasive social networks equipped with tools and facilities that enable behaviour change. This paper presents the case for domain-specific persuasive social networks and provides insights on problematic and addictive behaviour change. A 4-month study was conducted in an addiction rehab centre in the UK, followed by 2-month study in an online peer group system. The study adopted qualitative methods to understand the broad parameters of peer groups including the sessions' environment, norms, interaction styles occurring between groups' members and how such interactions are governed. The qualitative techniques used were (1) observations, (2) form and document analysis, and (3) semi-structured interviews. The findings concern governing such groups in addition to the roles to be enabled and tasks to be performed. The Honeycomb framework was revisited to comment on its building blocks with the purpose of highlighting points to consider when building domain-specific social networks for such domain, i.e. online peer groups to combat addictive behaviour.

Keywords: Online Peer Groups, Behaviour Change, Addictive Behaviour.

1 Introduction

Online peer groups exhibit their own characteristics which necessitate revisiting their design principles in comparison to general purpose social networks. Social surveillance differs from traditional surveillance in terms of the power, hierarchy, and reciprocity [1]. Traditional surveillance involves, for example, corporations monitoring populations for the purposes of law enforcement, while social surveillance is the process of monitoring activities for the purpose of influencing individuals' behaviours, i.e. persuasion through "overt" observation [2] and it is usually done by peers not only authorities. Online social surveillance utilises digital traces left by users to investigate behaviours and activities, also known as "dataveillance" [3]. The tools that social software offers, e.g. sharing and commenting, are the functional utilities that facilitate online social surveillance. Yet, they still lack theory-based solutions and best practices on how to employ such utilities. The high volume, speed, traceability and processability are all new features which necessitate a revision of the known principles and models for traditional social surveillance.

The Honeycomb framework [4] proposed to understand social media platforms from a functional perspective. Previous work on social informatics reviewed and suggested

adding extra blocks, e.g. social objects [5] and collaboration, to help designers shifting from Social Computing to Socially Aware Computing [6]. Socially aware systems are supposed to be socially responsible, universal and entirely satisfying users requirements [7]. Social interactions are driven by or revolve around a shared "object(s)", e.g. topic, idea, event or public figure [6]. Social objects help to maintain the focus of a social interaction [5]. This aligns with the use of social networks for domain-specific purposes such as persuasive online peer groups where the group is driven by a specific goal and centred on main issue. However, despites this recognition, there is still lack of enough practice and engineering principles on how to develop such platforms to boost positive behaviour and prevent side-effects [8].

This paper presents the results of a 4-month study that was conducted in an addiction rehab centre in the UK. An observational study was performed followed by practitioner interviews. This study was complemented by 2-months study on an online system for peer support group. The findings focus on group governance, roles to be enabled and tasks to be performed. The Honeycomb framework [4] was revisited to comment on its building blocks with the purpose of highlighting points to consider when building domain-specific social networks for such domain, i.e. online peer groups to combat addictive behaviour.

1.1 Addictive behaviour change

Behavioural change theories are mainly used to bridge the gap between attitudes and behaviours. These theories aim at reducing discrepancies between these two conceptual constructs such as, for example, the gap between the intention to change a behaviour and the act of actually doing so [9]. This is achieved by encouraging individuals to create a plan to achieve the targeted behaviour. These theories include (1) Theory of Planned Behaviour which emphasises the role of the intention to predict actions [10], (2) Social Cognitive Theory which also relates to the theory of planned behaviour but places a greater emphasis on the self-efficacy [11], (3) Control Theory which requires goal(s) as a reference value to assess the current rate of the behaviour [12], (4) Transtheoretical Model which suggests that an individual can be mapped to one of the five milestones: pre-contemplation, contemplation, preparation, action, and maintenance [13], (5) Goal Setting Theory which suggests that goals setting can positively impact the performance [14], and (6) Health Belief Model which requires feeling vulnerable to a health threat, in order to perform protective measures [15].

Online peer groups are a type of social software that utilises certain mechanisms, such as social pressure through surveillance [2], to change negative behaviours or to reinforce positive ones [8, 16]. Online interactions differ from face-to-face (AKA FTF) setting as they are performed in a less restrictive environment leading to more self-discloser [17]. Traditional online peer groups are used as forums to host treatment practice, such as counselling, which could be helpful for providing care and assisting positive behaviour in remote settings. Despite the new facilities online peer groups can provide, e.g. real-time and intelligent interventions enhanced by gamified and persuasive experience, designing them as typical social networks could lead to adverse side-effects [18]. This includes the spread of negative emotions, misleading peer comparisons, and spreading and justifying negative behaviours.

2 Methodology

The performed studies adopted qualitative methods to understand peer groups including the session environment, interaction styles occurring between groups' members and how those interactions are governed. The first study was on FTF peer groups for treating substance and behavioural addiction, followed by an interview with an addiction counsellor. This study was complemented by a document analysis method mainly for the forms and diaries used in the daily practice. These three methods were applied in iterative style, i.e. after each observation session and its analysis, an interview was conducted. A referral to the documents and diaries used by the practitioners was also used when needed, before or after the observation sessions and the interviews to support the preparation and the analysis, respectively. The second study concerned the analysis of online peer groups designed for treating problematic gambling to compare the practices in both the physical space and the cyberspace.

The data collected were textually analysed using qualitative content analysis technique, i.e. the priori coding technique. The contextual dimension, which focuses on the "*structural descriptions to various properties of the social, political or cultural context*" [19], was also considered in the analysis. Analysing the data textually and contextually is also known as discourse analysis [19]. The goal was to understand the main processes and activities of online peer groups as an approach to overcome addictive behaviours and the motivation of each process and what considerations to be taken into account.

More information about the research settings and full analysis of the data collected can be found in [20].

2.1 First study: traditional rehab centre

A 4-months observational study at an addiction treatment centre was performed to better understand the different stages of treatment. In the rehab centre, therapeutic sessions had a minimum of 7 participants and a maximum of 15, mixed genders, aged between 19 and 56 years old. Some of the clients were experiencing parallel addiction, such as problem gambling and alcohol abuse. Participants in the peer groups were selected so that different levels of addiction are included in the same group, i.e. some were at the prescribed medical detoxification stage arranged with the GP to treat withdrawal symptoms, while others were in the advanced stage of the treatment. The stages of treatment, e.g. Transition, Stabilisation were based on the model proposed in [21, 22]. All group therapy sessions were facilitated by a qualified therapist, with over 13 years of experience in this field. The therapist's role is to listen and when appropriate confront clients on the issues and problems they raise, in a process known as reflective listening. The observation study included 14 sessions for two groups, where each session lasted for an average of two hours.

The treatment of the first group was based on Marlatt and Gordon's model [23] for relapse prevention. The model explains the relapse process, which can occur as a result of the immediate determinants (e.g. high-risk situations and outcome expectancies) and covert antecedents (e.g. stress and urges). The treatment of the second group, the therapist utilised The GORSKI-CENAPS Clinical Model [24], particularly the Relapse Prevention Therapy (RPT) [25]. The observation study results were refined based on the interviews with the rehab centre specialists. The aim was to articulate common prac-

tices, especially focusing on the group activities, communications, and individuals' attitudes of clients. A set of documents were also analysed as a complementary approach for a holistic view. These documents comprise the initial warning signs list, warning sings analysis, and warning sign management and planning.

2.2 Second study: online peer groups

Another observational study was performed on an online peer group facilitated by an expert therapist to deal with problematic gambling behaviour. The aim of this study was to explore the practices in handling addiction in the online space. Gambling addiction is a behavioural addiction as well which part of the generic theme of digital addiction. Rather than the group evolvement over time, this study was focused on the general practices and communication styles and facilities, both those done by the therapist and those which can be facilitated through the online platform. The study was conducted over the period of two-months to enable capturing practices. The study was conducted in an online forum for a gambling addiction treatment charity that provides emotional support and practical advice on gambling to people affected by problem gambling throughout the world. The therapy provides text-based live support forum and consultations in addition to the wide verity of online support groups. These support groups run at various times of the day and facilitated by trained members of the therapy. The users participate online, and their identity is kept anonymous. The study followed non-participant observation to avoid any potential effect on the users' interactions and to avoid disrupting group work.

3 Results

This analysis concerned the various design aspects of peer support groups as a persuasive social network to change addictive behaviours. For this paper, we will present part of the findings focusing on: *tasks*, *roles*, *interaction styles*, *group evolution and stages* and *governance*.

3.1 Frist Study Results – Traditional Peer Groups

Group development and interaction

Tuckman's model [26] of group development was the approach adopted in the rehab centre. Accordingly, and to help new clients reaching performing stage in a shorter period, they were introduced to the groups already at that stage. While this strategy seems to require a high level of moderation, it helps to maintain established norms where new clients can start "performing" after a couple of days.

Interactions that indicate any form social hierarchy were deliberately avoided, i.e. status and power, within the group peers. The social hierarchy may emerge when a group includes new and senior peers. Senior peers refer to those who spent a longer period in the group. The social hierarchy may, also, naturally emerge from interactions such as in the case of peers with dominant character. Such social properties should not provide peers with any privileged position or extra influence. Indeed, senior peers are expected to hold more responsibility as they are considered role models. For example, as the counsellor commented: "*sleeping during the session* [for a senior member] *will not be tolerated like someone who just started the treatment*". Also, commented that

"*they* [those who have been in treatment for six to eight weeks] *would be more challenged compared to someone who is just coming to the door*".

Fig.1 provides an overall picture of group therapy in terms of the group development and the change in the interaction scope over time. Our model highlights four main stages of the rehabilitation path: (1) The pre-contemplation stage: users are in the active addiction with the lack of perceived need or intention to change, (2) Stabilisation stage: users are supported to "*regaining the biopsychosocial balance required to maintain abstinence*" [21, 22], and obtaining healthy coping skills to manage thoughts and feelings, (3) Active rehab: users are supported to understand and recognised addiction symptoms, promote and build a balanced lifestyle, learning management strategies and how to create a plan and maintain it, and (4) Aftercare: users are provided with additional support to build self-esteem and stay motivated while facing real life challenges. It involves follow-up meetings to prevent relapse.

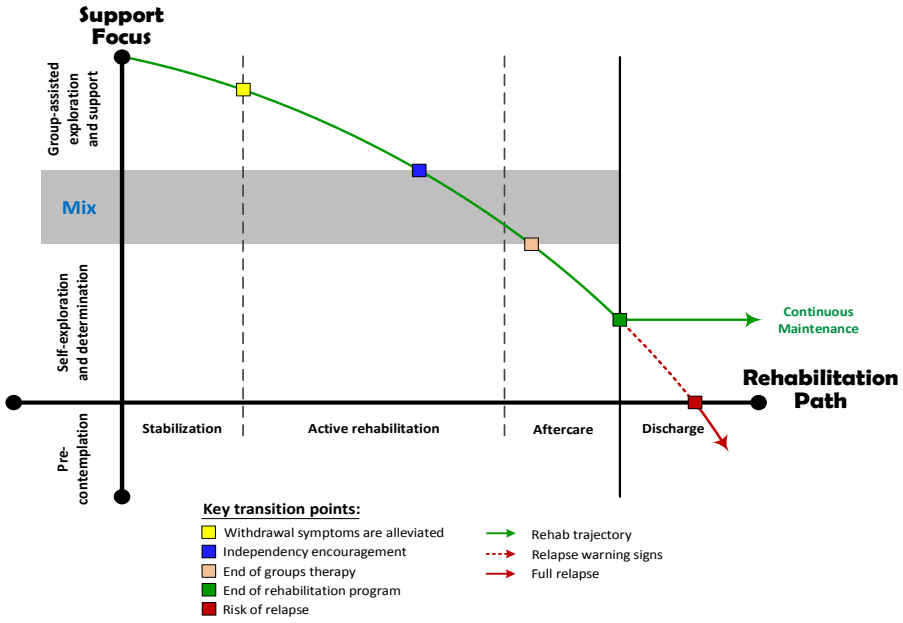

Fig.1: Peer group development lifecycle and milestones

During this lifecycle, users pass four transition points as shown in **Fig.1**. Also, the focus of the treatment changes as users proceed through these points. Clients remain engaged in group facilitated activities once they join the group and continue till the aftercare stage by taking a couple of follow-up group sessions. However, users' participation in group work is expected to decrease over time. So, they can focus on the self as they proceed to the discharge stage. In the active rehab stage, after passing more than half of the treatment programme, the journey enters the mixed phase. In this phase, users are actively engaged in group work and are also offered opportunities to do a variety of self-care and self-assessment tasks which increases over time.

Fig.1 is meant to provide designers of online peer group platforms with a high-level guide to how the system should operate and what features and functionalities need to consider for different stages. For example, general purpose social networks, Facebook, for example, are designed to encourage an increased participation and networking activities while online peer groups as a domain-specific social network shall be designed

to deliberately reduce social activities over time and to start encouraging more self-focused activities.

Tasks considerations

Three dimensions characterize the tasks performed by clients in the rehab centre. The first concerns the immediate motivators of the assigned task or activity, e.g. ice breaking, hope installation, and norms maintenance. The second concerns the interaction style or mode of delivery that is also should be planned to mediate planned purposes, e.g. discussion, confrontation, competition, and collaboration. The third concerns the functional activities that support achieving the planned purpose(s), i.e. the method of delivery, e.g. problem solving, diaries, and groups versus individuals' competition.

Over the period of the observation study, it was also observed that starting the sessions with *check-in* activity is a good practice where each client is given a chance to mainly describe their current emotional state. The reason is "*to ensure that clients focus on where they currently are and what they intend to do* [when addressing negative emotions]". Clients shall be aware that "*addiction, in a way, is running out from painful emotions*". By performing this activity, clients are taught to recognise their actual emotional state and given a chance to voice it. Throughout the observation study, addicts seemed, normally, willing to talk about what makes them happy but hide and avoid talking about their negative emotions, e.g. sadness, shyness, being upset and worried because there seem to be difficulties in expressing that fully. Being able to express that is a way of coping. As such, regular practising of this simple activity will address this side of addicts' ability. While some purposes are decided based on the group or individual needs, some tasks such as "check-in" are compulsory.

The peer groups in the rehab centre were based on the mainstream 12 steps programme of Alcoholic Anonymous (AA) and the group's interactions revolved around those 12 principles. A special focus in the observation study concerned step 4 of the Gorski's model [25] which was applied to the group at the rehab centre. In this step, clients are required to write a list of their personal warning signs that could lead to a relapse. This can be mapped to the step 12 of the AA which reads: "Continue to take personal inventory and when we were wrong promptly admitted it". Both the 12th step programme of the AA and step 4 of Gorski's model are mainly focussed on relapse prevention. In the rehab centre, the last 30 days of the treatment were focused on step 4 of Gorski's mode. After that, clients are gradually moved to the aftercare treatment by attending additional sessions in the aftercare groups. The clients of these groups were fairly known to each other and shared membership in similar groups in the past which was an important aspect to maintain group cohesion in the aftercare sessions.

Steps 11th and 12th of the AA are focused on spiritual practices that can be performed outside the rehab centre. What is mentioned above suggests the need to consider the steps from 1 to 10 when designing the tasks of peer groups activities as well as paying attention to the sequential order of these steps. This will ensure a logical evolution of group envelopment. For example, asking clients in the early stages of the treatment to write personal inventory would not yield any improvement as clients are still in their biased perception. Another example concerns the step 1 of the Alcoholic Anonymous which read: "we admitted we were powerless over alcohol - that our lives had become unmanageable". Each client performs this step individually with the counsellor through writing examples of bad personal behaviours. This was one of the crucial preconditions to be admitted into the treatment programme. This suggests that the 12th steps of the AA are stage-based with admittance and help-seeking being a key requirement. Online

peer group design should support a managed dialogue and evolve its allowed set of interactions as time passes and as progress is made.

Roles considerations

There are different types of roles that can exist within small groups for behavioural change. Bastes [27] defined the term *role* as a part of social status within a social structure. A social structure consists of distinguished behavioural expectations, i.e. norms. Here, the researcher refers to the roles that define the self [28] and are associated with a set of expectations, such as acted roles, e.g. group 'facilitator'. However, Callero [28] pointed out some roles are not formal and hard to be fully defined with regard to expectations only, such as the roles that can evoke complex feelings and can be unconsciously played. Some roles are subject to behaviour impulses and arise during the interaction, such as most of the roles addicts may play, e.g. 'relapsed'.

Hare [29] proposed a set of guidelines to classify roles within small groups. These guidelines suggest that roles should be either "functional", "communication-based", "emotional" or "dramaturgical". For the case of online peer groups, these categories for changing addictive behaviours, e.g. introducing gatekeeper and facilitator as functional roles. Furthermore, this paper introduces *stage-related roles* as a new family of roles related to the stages of treatment, e.g. senior and relapsed. This list of roles, which were derived from our study shall guide in the design of online peer groups. **Table 1** summarizes the list of roles in their four categories.

Table 1. Social roles classified into four classes.

Functional Roles: they refer to roles involving status, control and access to recourses. Each member in the group can play one role only, except the role "*peer*" who can be temporally assigned as a "*leader*".	
Gatekeeper	A person who has the authority and control over particular resources
Facilitator	An assigned person who is expected to lead, guide and provide knowledge
Co-Facilitator	An assigned person who is expected to help and support the facilitator
Peer	A person who shares similar behavioural issues and experience
Observer	A person who is permitted to join temporarily for observational learning
Leader	A temporary role played by all senior clients
Stage-related Roles: they refer to roles associated with stage of treatment. Each member in the group can play one role only, except the role "new peer" who can also be "in-Detox" as well.	
Recovered	A peer who can be described as recovered based on the current behaviours
Senior	A peer who has spent longer time in the treatment and adopted healthy behaviours
New peer	A peer who is new to the group
in-Detox	A peer who is in the process of medical remodelling (i.e. removal of toxic substances)
Relapsed	A peer who experienced very recent relapse episode
Communication Roles: they refer to the roles related to interaction. Peers play multiple roles at once.	
Role model	A peer who is expected to be an example to be imitated and inspire others
Isolates	A peer who refuses/has not developed the ability to interact with others
Sociable	A peer who is willing to talk, engage and collaborate with others
Complying	A peer who adheres to rules and norms to achieve personal goals rather than to recover
Scapegoat	A peer who is deliberately excluded on the group basis
Rejected	A peer who is deliberately excluded on the individual basis
Withdrawing	A peer who tends to withdraw from activities or participate passively
Competing	A peer who tends to compete in different tasks for the sake of having power
Disrupting	A peer who disrupts group natural development
Dominant	A peer who attains high degree of influence in a group and wants to heave the control
Denying	A peer who is in extreme conscious denial to avoid consequences
Emotional Roles: they refer to roles representing emotional themes. Peer can play multiple roles at once	
Attention seeker	A peer who wants to be the centre of attention in the group
Avoidant	A peer who has a false feeling of inadequacy and uses avoidance to cope

Victim	A peer who believes that he is always treated unfairly or taken advantage of
Crisis	A peer who is always expressing negative thoughts
Follower	A peer who admires a particular person or believes in system of ideas
Fixer	A peer who prevents other peers from expressing their emotions, e.g. “do not worry!”
Helper	A peer who supports other peers and encourage a positive behaviour

3.2 Second Study Results- Online Peer Groups

The second study revealed two additional facets, which will require both management and design consideration when facilitating peer support groups by online platforms.

Online support

Online media can provide more access to help by reducing time, costs, and personal barriers, such as reluctance to seek help, stigmatisation and confidentiality concerns. Unlike the FTF peer groups, online groups are more agile and open where users are free to join as much as they like without progressive protocol that controls the process. This has its benefits and limitations. Examples of different aspects of help provided include emotional support and practical tips, and understating causes and consequences of the behaviour with the aid of qualified counsellor. Overall, the current online support is typically more concerned with *informing* users and helping them to decide goals and provide an environment for social enforcement. The support in its current status and with the lack of dedicated platforms would mainly work for post-residential support and outreach for clients. In our observed system, users were only able to use the system to interact with each other during the pre-arranged meetings.

Online support groups are typically not intended to substitute intensive psychological treatment; but more as complementary by helping users who are less motivated to start the therapy, and perhaps need support. It could be also helpful for after-care treatment to avoid relapse. The pillars of the online support within the observed platform can be outlined as being not judgemental, less confronting, comforting, practical information, requires the help-seeking attitude and focused on awareness building.

Interaction environment

Similar to most available online health forums, the interface of the online peer group observed was relatively simple. They offer the main interface that shows actual live conversations and recommendations. They also offer a limited amount of pictorial representation of facial expressions. The interfaces are designed in a way that avoids providing users with immersive experience. The interface facilitates finding out who is online during the group meeting as well as who moderates the session. The group's interactions are typically facilitated using synchronous text-based communication. These systems are mainly designed as a group chatting service.

Similar to the traditional rehab centre, users are not allowed to create their own chat rooms, and no private communication features shall be offered. This is to avoid promoting bad behaviour and distraction. For example, the following features were not offered: *poking*, *who is viewing my profile* and *private chatting* including the so-called *whispering* feature which enables a user to communicate to another user without a publicly visible dialogue. The platform observed was designed to discourage in-person communication, and all interactions were mediated using the online system. In online peer groups, there seem to be communication norms followed. For example, the use of capital letter which were perceived as shouting and aggressive behaviour. While this

depends on the context, it can create misunderstanding. These cyber norms seem important to ensure friendly environment but can be easily missed. Other types of communications include *actions* by adding words between brackets or stars, e.g. *thumbs up*. However, users were reminded that this is a support service rather than a medium for social networking. Hence, these must be used in moderation.

4 Designing Online Peer Groups as a Social Software

4.1 Online peer groups as a social software

In the light of the results obtained from the conducted observational studies and the findings from [8, 18], this research concluded eight essential building blocks for such platforms: conversation, sharing, reputation, identity, presence, collaboration, awareness and assessment. The first five blocks exist in the original honeycomb framework, while (collaboration, assessment and awareness) are the added ones. The blocks (groups and relationships) were excluded. Let's start discussing these exclusions first.

In online peer groups, the ***group*** block is an integral basic attribute, i.e. part and parcel of this social context. As such, the analyses of the persuasive mechanisms should always consider group dynamics and social psychology influences as a central perspective in these systems. Providing this type of users with the means to form communities can be very risky to the individuals and to the group performance.

Typically, forming ***relationships*** between users during intensive rehab treatment is discouraged, unless it is defined and moderated by therapists. Personal relationships could lead to deep intimacy, which may create a risky situation in the recovery process. The literature of computer-mediated communication already points out that visual anonymity and self-disclosure are likely reciprocated and could lead to high level of intimacy [30]. Combining that with the opportunities the system may provide to form a one-to-one relationship in online space can be very negative. In more liberal governance styles of peer groups [8], relationships might be allowed with precautionary measures, such as implementing auditing features to emphasise the element of authoritative surveillance.

According to the honeycomb framework, voting features such as "like", "re-tweet" and "share" aggregate counts to reflect the ***reputation*** of social entities. This is the implicit representation of the honeycomb framework blocks. Users are provided with "Flagging" tools to report offensive and harming digital materials. This is a kind of governance mechanism to support social responsibility in dealing with the massive collections of user-generated content. "Flagging" in this sense is not a technical feature only, but a socio-technical mechanism that enables users to express their concerns. Individuals values, social norms and community guidelines play a role in setting standards to assess content and actions according to these bodies of moral values [31].

In peer groups, assigning users to different groups is based on assessment procedures. This entails commencing with user assessment through personal interviewing for severe cases or screening questions for moderate ones. Then, assessment of the suitability for a particular user to a specific group. As such, this paper argues the need for introducing the ***assessment*** block to the framework.

Users in such systems are expected to collaborate with each other to progress in the treatment. In peer groups, collaboration is a critical element to help boosting group

performance [6]. ***Sharing***, which is another standalone block, can be seen as a functional trait within the collaboration block in online peer groups. Unlike groups in open forums, the avoidance of sharing, e.g. self-disclosing, is seen as a form of resistance.

The ***identity*** block as Kietzmann et al. [4] explains revolves around self-disclosure. However, in peer groups, this block should be less emphasised over time as a member approaches the aftercare stage and then to be completely removed, i.e. the member profile, after their discharge. In the case of relapsing after the discharge, a new identity would need to be created, since the relapsing is a process that could start with negative behaviours and then moving to many critical warning signs before a full relapse.

Peers' accomplishment, goals and the overall treatment progress would have a direct influence on the ***self-awareness***. This can lead to greater adherence to the treatment goals and correlate to functional features of the online platform. Other features can support ***social awareness***, e.g. a system showing accomplishments of others based on their competence in certain tasks that may create an opportunity for collaboration.

The social ***presence*** which can include encouraging self-disclosure and communication are important aspects of the peer group environments. "*Personal isolation is a strong aspect of addiction*" as a therapist highlighted in the treatment centre. These indicate the importance of considering the ***conversation*** block on the online platform.

4.2 Online peer groups as a tunnelling-based persuasive technique

Tunnelling is a persuasive technique that aims at "*using computing technology to guide users through a process or experience provides opportunities to persuade along the way*" [2]. Some characteristics of the persuasive techniques include: (1) Applying high control over the interaction environment where the persuasion expected to occur, (2) Reducing the level of uncertainties along the way of the tunnel, (3) Controlling and guiding the user experience through staged-based processes, and (4) People voluntarily enter the tunnel, i.e. people in online peer groups are characterised as help-seekers [2]. In the peer groups, people give up "*a certain level of self-determination*", exposed to a predetermined experience that increases the opportunities for persuasion. Tunnelling can be useful persuasion strategy.

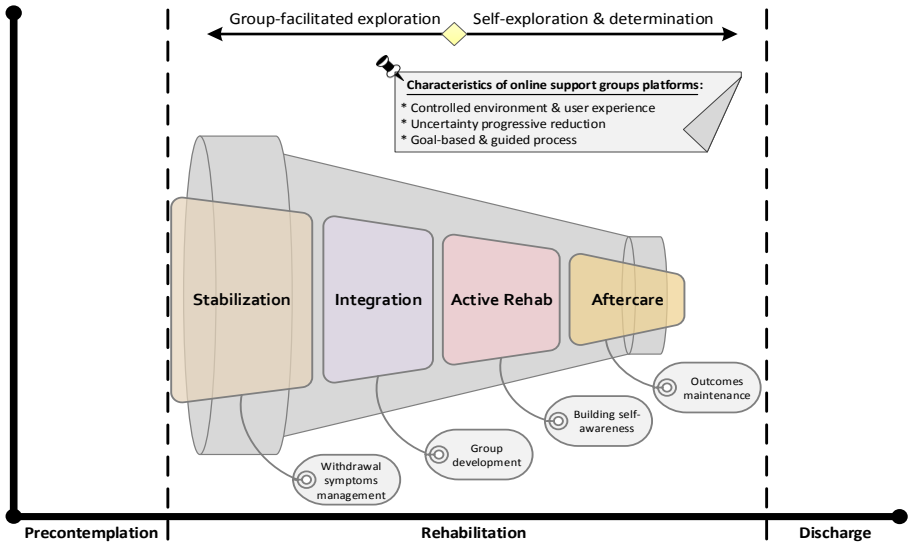

Fig.2: Online peer groups as a tunnelling-based technology

Fig.2 proposes a reference model for how online peer groups should look like when viewing it through the lenses of tunnelling persuasive technology. The online peer group platforms can guide users through the various steps to analyse their behaviour, set up goals, and decide the plans to achieve these goals. It could also guide users through a series of questions designed to identify problematic triggers, personal traits and habits and make tailored suggestions to improve them.

5 Conclusion

Social software systems are expected to provide interactive tools to build and maintain social connections and facilitate mass interactions and collaboration among individuals. The results suggest that the design constructs of social software are not sufficient enough to influence behaviours for users who want to achieve specific goals and make positive change. Using such systems to mediate behavioural change may lead to negative concrescences as they were not built for this purpose. This paper calls for an exploration into the theoretical aspects of social software design to enable building systems that mediate persuasive messages to the targeted audience. This paper highlights the lack of frameworks for designing social software for specific purposes.

Acknowledgment

This work was partly sponsored by the EROGamb project, funded jointly by GambleAware and Bournemouth University. We also thank StreetScene Addiction Recovery and the Gambling Therapy for their support.

References

1. Marwick, A.E.: The Public Domain: Social Surveillance in Everyday Life. Surveillance and Society. 9, 378–393 (2012).
2. Fogg, B.J.: Persuasive Technology: Using Computers to Change What We Think and Do (Interactive Technologies). (2002).
3. Leth Jespersen, J., Albrechtslund, A., Øhrstrøm, P., Hasle, P., Albretsen, J.: Surveillance, Persuasion, and Panopticon. In: Using activity theory to model context awareness. pp. 109–120. Springer Berlin Heidelberg, Berlin, Heidelberg (2007).
4. Kietzmann, J.H., Hermkens, K., McCarthy, I.P., Silvestre, B.S.: Social media? Get serious! Understanding the functional building blocks of social media. Business Horizons. 54, 241–251 (2011).
5. Cetina, K.K.: Sociality with Objects: Social Relations in Postsocial Knowledge Societies. Theory, Culture & Society. 14, 1–30 (1997).
6. Pereira, R., Baranauskas, M.: Social Software Building Blocks: Revisiting the Honeycomb Framework. Information Society (i-Society), 2010 International Conference on. IEEE, 2010. (2010).
7. Baranauskas, M.: Socially Aware Computing. Presented at the Proceedings of VI International Conference on Engineering and Computer Education (2009).
8. Alrobai, A., McAlaney, J., Phalp, K., Ali, R.: Online Peer Groups as a Persuasive Tool to Combat Digital Addiction. Presented at the 11th International Conference on Persuasive Technology, Salzburg April (2016).
9. Webb, T.L., Sniehotta, F.F., Michie, S.: Using theories of behaviour change to inform interventions for addictive behaviours. Addiction. 105, 1879–1892 (2010).
10. Ajzen, I.: The theory of planned behavior. Organizational behavior and human decision processes. (1991).

11. Bandura, A.: Social foundation of thought and action: A social-cognitive view. Englewood Cliffs (1986).
12. Carver, C.S., Scheier, M.F.: Control theory: A useful conceptual framework for personality–social, clinical, and health psychology. Psychological Bulletin. 92, 111–135 (1982).
13. Prochaska, D.J.O.: Transtheoretical Model of Behavior Change. In: Gellman, M.D. and Turner, J.R. (eds.) Encyclopedia of Behavioral Medicine. pp. 1997–2000. Springer New York, New York, NY (2013).
14. Strecher, V.J., Seijts, G.H., Kok, G.J., Latham, G.P., Glasgow, R., DeVellis, B., Meertens, R.M., Bulger, D.W.: Goal Setting as a Strategy for Health Behavior Change. Health Education & Behavior. 22, 190–200 (1995).
15. Janz, N.K., Becker, M.H.: The Health Belief Model: A Decade Later. Health Education Quarterly. 11, 1–47 (1984).
16. Davidson, L., Chinman, M., Kloos, B., Weingarten, R., Stayner, D., Tebes, J.K.: Peer support among individuals with severe mental illness: a review of the evidence. Clinical Psychology: Science and Practice. 6, 165–187 (2006).
17. Al-Deen, H., Hendricks, J.A.: Social media: usage and impact. (2011).
18. Alrobai, A., McAlaney, J., Phalp, K., Ali, R.: Exploring the Risk Factors of Interactive E-Health Interventions for Digital Addiction. International Journal of Sociotechnology and Knowledge Development. 8, 1–15 (2016).
19. Lupton, D.: Discourse analysis: A new methodology for understanding the ideologies of health and illness. Australian Journal of Public Health. 16, 145–150 (1992).
20. Alrobai, A.: Engineering Social Networking to Combat Digital Addiction: The Case of Online Peer Groups, (2018).
21. Gorski, T.: Passages Through Recovery. Hazelden Publishing (2009).
22. Gorski, T.: Recovery From Addiction: Gorski's Operational Definition, https://terrygorski.com/2013/10/15/recovery-from-addiction-gorskis-operational-definition/.
23. Marlatt, G.A., Gordon, J.R.: Determinants of relapse: Implications for the maintenance of behavior change. (1978).
24. Gorski, T.: The GORSKI-CENAPS Clinical Model, http://www.tgorski.com/clin_mod/clin_mod.htm.
25. Gorski, T.T.: Relapse prevention planning: A new recovery tool. Alcohol health and research World-National Institute on Alcohol Abuse and Alcoholism (1986).
26. Tuckman, B.W., Mac Jensen: Stages of small-group development revisited. Group & Organization Management (1977).
27. Bates, F.L.: Position, Role, and Status: A Reformulation of Concepts. Social Forces. 34, 313–321 (1956).
28. Callero, P.L.: From Role-Playing to Role-Using: Understanding Role as Resource. Social Psychology Quarterly. 57, 228–243 (1994).
29. Hare, A.P.: Types of roles in small groups: A Bit of History and a Current Perspective. Small Group Research. 25, 433–448 (1994).
30. Joinson, A.N.: Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. Eur. J. Soc. Psychol. 31, 177–192 (2001).
31. Crawford, K., Gillespie, T.: What is a flag for? Social media reporting tools and the vocabulary of complaint. New Media & Society. 18, 410–428 (2016).