

Researching Procrastination on Social Networking Sites

Procrastination has become an important field in the academic research. It refers to a voluntary delay that might lead to negative consequences such as low academic performance, low work productivity, and anxiety. Numerous studies have examined the factors that might lead people to procrastinate such as low self-efficacy, low self-regulation, and low self-esteem. However, Social networking sites (SNSs) might be partially responsible for people procrastinating because users may stay online rather than performing their urgent tasks. SNS users have increased significantly in recent years and this raises the question of whether the design of SNS features has contributed to users procrastinating and why this is the case?

The research studies the relationship between SNS feature design and procrastination and also identify what features of SNSs might be able predict the likelihood of user procrastination. Furthermore, we identified different countermeasures that can be introduced to the future design of SNS in order to combat procrastination. Then, the research develops a method that helps users to gain more control over their procrastination. This method is informed by psychological theories, interactive design, and usability evaluation and testing. The method can be used to inform software engineers when developing the design features for future software in order to help users to gain more control over their procrastination.

To achieve this goal, several studies were conducted with SNS users. These studies include focus group, diary study, co-design, and online questionnaire. The results of these studies will guide the research to devise the final method of the research. The final method will be supported by persuasive techniques in order to help users to change their behaviour and gain more control over their procrastination without forcing them to change. In the following sub-sections we explained the procedures and provided the supplementary materials that we used in each study.

1. Qualitative phase: Focus group

Two focus groups sessions were conducted with a total of sixteen participants. In order to enhance the discussion and avoid clustering and digression, the participants were divided into two sessions; the first session comprised nine participants and the second had seven participants. The focus group questions were based on four base questions. These four questions were designed to fill the gap that has been identified in the empirical literature regarding providing more details about the nature of the role of SNS design in facilitating procrastination.

- What is the general perception of procrastination and social media?

- What are the different types of procrastination on SNSs and users' motivation for facilitating procrastination?
- What are the relationships between these types of procrastination and SNS features?
- What are the types of procrastination countermeasures that can be facilitated through SNSs?
- What are the participants' views about incorporating them in future SNSs; i.e. their acceptance?

During the first fifteen minutes of each session, a short presentation was given by the researcher to ensure that the participants were fully briefed regarding the concepts of the study, such as the research problem and the persuasive techniques that could be used in the future to mitigate the procrastination problem. Therefore, this study maximise the quality of the data collected and avoid any misconceptions. After that, certain persuasive techniques were presented as an initial solution that could help to overcome the research problem. In the second part of the focus group, three scenarios were discussed. These scenarios provide examples that explain how people procrastinate when using SNSs (see table 1).

Table 1: focus group scenarios

First scenario

It's Monday morning and Sam has a lecture in mathematics. This lecture is really important to him because it is a revision lecture before the final exam and he arrived early for it. After the first hour, Sam started to feel bored. He decided to check his Instagram to see how many likes he got for his last post and whether anyone commented on it. Then he reassesses his priorities, realises this is an important lecture that he needs to focus on but still thinks that 10 seconds to refresh my mood would not hurt my focus. Finally, he opens his Instagram and finds that his best friend is commenting on the photo and starts to chat with him. After 15 minutes he notices that he has missed the most important part on the lecture.

Please answer the following questions:

- In your opinion, why did Sam spend 15 minutes on Instagram?
- What would you think of the idea that Instagram encouraged Sam to stay online for 15 minutes?
- Can you think of some features in Instagram that might have led to or facilitated Sam procrastination?
- How can we help Sam to avoid this situation again?
- Would you like to add any further thoughts?

Second scenario

Laura is an undergraduate student in the first year and she has her final exam tomorrow. She is

studying hard to get a good result and while studying she faced a difficult task that needed further explanation to understand the concept. She was thinking of finding a video on YouTube to help her. She started looking and found a video that explained the same task. Later, from the 'recommended list' she found some related topics and started browsing them. After one hour she found herself wasting time and not doing what she was supposed to be doing. Her stress level had increased and she began to worry about her studies. As a result, she spent more time studying that night instead of sleeping.

Please answer the following questions:

- In your opinion why did Laura spend one hour on YouTube?
- What would you think of the idea that YouTube encouraged Laura to stay online for one hour?
- How can we help Laura to avoid this situation again?
- Would you like to add any further thoughts?

Third scenario

Tom has an interview for a job and he woke up early to ensure that he would arrive 10 minutes before the meeting. He arrived at the bus stop, checked the bus timetable and found that a bus would arrive in 3 minutes. He opened his phone to check his friend's account on Twitter but suddenly he found breaking news about his favourite team that had signed a contract with a new player. Tom started looking for some information about that player while he was waiting for the bus. After 5 minutes he noticed that he had missed the bus and the next one was not due for another 30 minutes. As a result, he feels angry and stressed and calls a taxi to drop him at the company which costs £25.

Please answer the following questions:

- In your opinion why did Tom spend five minutes on Twitter?
- What would you think of the idea that Twitter encouraged Tom to spend 5 minutes on Twitter?
- What made Tom change his aim from checking his friend's profile to suddenly seek information about the player?
- What would you think of the idea that Twitter encouraged Tom to stay online for five minutes?
- How can we help Tom to avoid this situation arising again?
- Would you like to add any further thoughts?

Please answer the following questions:

- Can you give an example of different SNSs features that may facilitate users to procrastination?
- Which scenarios might happen for people most often?
- Can you think of different situations that lead people to spend time online procrastinating?

- How would you feel if somebody else procrastinates to avoid a task that is given by you?
- Would you like to add any feedback?

2. Qualitative phase: Diary study

We conducted a diary study in order to validate the focus group finding and to elaborate in the initial finding of the focus group. The diary study sought to confirm the focus group findings and seek additional formation regarding how SNS features may facilitated users to procrastinate. It has also sought to name the countermeasures that were reported by the participants as useful techniques to help people gain more control of their procrastination. The participants were asked to record their stories once they felt they were procrastinating and send these stories to the researcher via WhatsApp. A template of the procrastination story was sent to the participants in order to help them to use this template when recording their stories to ensure that data bias was avoided (see Table 2). The template was designed to cover the study aspect and was discussed and approved by the research supervisory team. An example of one of the reported story is presented in table 3.

Table 2: Diary study template

Did you become distracted by social network sites when you were focusing in your work? Can you explain how?

Today I procrastinated within (1) (write below which social networking sites you tend to use? for example, Instagram, YouTube, Twitter, etc.). I was working on or I avoided starting my urgent task (2) (What was your urgent task? For example, preparing for an exam or attending a class, etc.) When I received or I felt (3) (describe your trigger to social network sites. For example, you receive a notification or feel bored). I was doing (6) (Describe your activities on social networks. For example, chatting with your friend or seeking information) after some time I recognised that I had to go back to the urgent task and avoid procrastination.

Answers

- 1-
- 2-
- 3-
- 4-
- 5-
- 6-

- **Write the techniques that you have chosen to control your procrastination**

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Table 3: An example of the reported story during the diary study

My procrastination log:

Day 1

I was on Facebook, when I should have been doing my dissertation introduction; I received a notification on my phone from Facebook so I opened the app to look at the notification. I then saw something on my newsfeed that took my interest and began to scroll through my newsfeed. When I realised I was procrastinating I found it easy to stop as I knew I needed to get on with my work, so I closed the app and turned my phone over so I couldn't see the screen so I wouldn't know if I got another notification.

Day 2

Checked Instagram, when I should be doing my dissertation introduction, I felt bored so thought I would check it for a little while, during this time I was scrolling through the newsfeed. When I realised I was procrastinating I closed the app and thought I would go for a cigarette to have a break as I knew that I would procrastinate again shortly if I did not take 5 minutes to have a break and then I would be able to get back to my work. I'm normally quite good at knowing when I need to step away from my work for 5 minutes so that I can get my concentration back after 5 minutes. Even though having a cigarette is procrastinating too I find that taking 5 minutes allows me to take a short break meaning I can focus on my work better when I return.

Day3

I was on Facebook looking through newsfeed, I was meant to be working on my diss. I went on to reply to a message my friend has sent me and ended up looking for about 5 minutes. Once I realised I was procrastinating I closed that tab as I opened it on browser and got back to work I didn't find this hard to stop as I had removed the stimulus and wasn't on my phone but rather the computer so closing the tab meant that I was no longer on it to be distracted by it.

Day4

I was on snapchat when I should be typing up my transcripts, I was watching other peoples stories as I felt bored so wondered what other people were doing, when I finished watching my friends stories I closed snapchat I find it hard to stop procrastination from snapchat as I find I have to watch all of my friends stories before I close the app. So depending on how many stories there are depends on how long I procrastinate however once I have watched all the stories I can go straight back to work.

Day5

I was on Instagram, when I should have been transcribing my interviews I got a notification so I opened the app and started to look through the newsfeed. When I realised I was procrastinating, I found it a little bit more difficult to stop I think this is because the task I was doing was tedious

however I did manage to think that I need to get on with my work so I closed the app on my phone

Day6

Received a snapchat from my friend when I was doing university work, I opened snapchat and replied to her snapchat, I then began to looking through my stories where I had about 5 once I had watched these I closed the app and continued with my work. I wasn't difficult to get back to work because I had watched everyone's snapchats

Day7

I was tagged in a video on Facebook so I was watching it, when I should have been doing uni work, the next video loaded quickly and this was something that seemed interesting so I watched that too, after watching that one I realised I was procrastinating and put my phone screen down on my desk. I didn't find it hard to stop as it was a video that caught my attention so once I had watched It I closed my phone.

Day8

I was looking though Facebook, I felt bored so decided to have a look on Facebook when I realised I was procrastinating it was hard to stop as I opened Facebook from being bored so I didn't really want to go back to doing my work. So I decided to go for a cigarette as this would give me a time limit on how long I could look for and would put my back in the mind frame of doing work again.

The best technique for me would be time restriction; this is because my procrastination normally starts due to me getting a notification so my attention is switched so therefore if I was unable to receive notifications at set times from Facebook and Instagram this would help me. This would be ideal to see within the software- if you could put blocks in place for the app at set times for example 10-12 and then 2-4. I would find this successful for me as it would prevent me from procrastinating in the first place and will also help prevent me from doing it when I am just bored as well.

3. Qualitative phase: Co-design study

The study is designed to identify the countermeasure techniques that can be used in future designs of SNSs in order to combat procrastination and provide details of how best to apply them. Based on the findings of the previous studies, we identified various families of SNS features that facilitate users to procrastinate. It is expected that the findings of the co-design study will illustrate different families of countermeasures that will help to combat procrastination. Moreover, the study will explore the side effects for each technique and the modality of the application that can best help to minimise these side effects. In addition, the study will explore whether allowing participants to map between families of

SNS triggers and countermeasure families helps users to identify what are the most suitable techniques for each feature.

Co-design: questions

- What are the different techniques that can be embedded into future designs of SNS in order to combat procrastination?
- What are the expected side effects of applying these countermeasures?
- How can we seamlessly embed the countermeasure techniques in SNS without affecting user experience?

Two design sessions were conducted with a total of four teen participants. In the sessions the researcher presented the previous finding of the exploration study which has been done in the exploration stage. Then, participants were encouraged to discuss different scenarios that illustrated how procrastination happened in SNSs and how SNS features designed to facilitate users to procrastinate. The scenarios were designed based on the finding of previous study (see Table 4). Participants also were encouraged to utilise different techniques and how they would like to perceive them in the future design of SNS in order to combat procrastination. Finally, the researcher encouraged participants to map between the families of SNS features and the families of the countermeasures. This achieved by using card sorting technique. The researcher used open card sorting which offer more flexibility by allowing the participants to suggest a new techniques to combat procrastination.

Table 4: Co-design scenarios

First scenario (notification features)

Sam has a lecture in mathematics that requires his full attention. While Sam was focussing on his studies, he received a notification from his friend and thought that replying to the message would not do any harm because it would take less than a minute. However, when he replied he continued chatting for 10 minutes and did not realise he was procrastinating. He tried to deactivate notifications but this caused him to open WhatsApp frequently to see if he had received any messages.

Answer the following questions:

- What countermeasure could be used to help Sam avoid procrastinating the next time this happens?
- Are there any side effects when applying these techniques?
- How can we set the countermeasure?
- Are there any additional techniques that can be used to avoid this situation arising again?

Second scenario (interaction feature)

Sara has graduated from the department of management and she has an interview for her first job after two days. Sara thought that she could practice the interview with a friend; both decide to meet at a

local restaurant in one hour. While she was waiting for the bus she felt bored so she decided to chat with her sister to pass the time. The conversation really caught her interest so she kept chatting for a long time without noticing that time was passing quickly. While she was chatting, her sister also sent a link for a post on Instagram; she saw the post and commented on it. Eventually she realised that the bus has gone which led her to wait another 30 minutes for the second bus.

Answer the following questions:

- What countermeasure could be used to help Sam avoid procrastinating the next time this happens?
- Are there any side effects when applying these techniques?
- How can we set the countermeasure?
- Are there any additional techniques that can be used to avoid this situation arising again?

Third scenario (identity feature)

Mark is a student in the final year in the department of Information Technology. He heard that one of his friends was able to earn £2,000 by advertising products on Instagram. He liked the idea and started to think about doing the same. Mark signed up on Twitter and started trying to increase his number of followers by tweeting with different hashtags. Mark spent most of his time on Twitter, even during his classes and each day his number of followers grew. Mark subscribes to a different group and in order increase his relatedness he was trying to reply and comment on each tweet to improve his identity and build a positive self-image. Mark started to become worried about his procrastination because the exams were looming.

Answer the following questions:

- What countermeasure could be used to help Mark avoid procrastinating the next time this happens?
- Are there any side effects when applying these techniques?
- How can we set the countermeasure?
- Are there any additional techniques that can be used to avoid this situation arising again?

Fourth scenario (immersive design)

Clara is in the second year in the department of law. Clara usually spends most of her time on YouTube, especially before going to sleep. One day she had an exam and before the exam she prepared very well so she felt confident of getting a high mark. As usual, before going to sleep that night she browsed YouTube. She watched a funny video about cats and then the recommended list suggested more videos about cats. She was enjoying watching these videos and the time passed quickly; she did not realise how long she had been viewing YouTube. Finally, she realised that she had not slept yet and the time was 4:30am. She slept for two hours and woke up early to revise but she found it very hard to focus due to a lack of sleep.

Answer the following questions:

- What countermeasure could be used to help Clara avoid procrastinating the next time this happens?
- Are there any side effects when applying these techniques?
- How can we set the countermeasure?
- Are there any additional techniques that can be used to avoid this situation arising again?

Fifth scenario (surveillance of presence)

Sophia is a lecturer. She sent a message using WhatsApp to her colleague to ask him for a meeting after the lecture. The lecture had started and she had not yet received a reply. During the lecture she kept checking her WhatsApp frequently to see whether her colleague was online. Also, Sophia checked other SNSs to see whether her colleague had been online or posted anything new. She started to become worried because she thought that he might have seen her message and chosen to ignore her.

Answer the following questions:

- What countermeasure could be used to help Sophia avoid procrastinating the next time this happens?-
- Are there any side effects when applying these techniques?
- How can we set the countermeasure?
- Are there any additional techniques that can be used to avoid this situation arising again?

4. Quantitative phase: Confirmation

In this phase, we sought to examine the qualitative findings of the previous studies with a sample of the population. This helps to ensure that we established the main features that may facilitate procrastination on SNS and their related countermeasures to combat it. We conducted an online questionnaire and distributed it to students' mailing lists in both UK and KSA. Leaflets and posters including the invitation and the link to the survey and its QR code were also distributed in the campuses of two universities. The questionnaire sought to examine the extent to which the respondents agreed on the findings of the exploration stage, i.e., focus group, diary study, and the co-design session. The survey also asked questions in relation to personality, self-control and culture with the aim of studying their effects on the selection and agreement of procrastination occurrences and their countermeasures. Only 334 participants (147 female and 187 male) successfully completed the questionnaire. The selection criteria involved participants who had at least one active SNS account and also self-declared that they significantly experience procrastination on SNS. The survey was active for four weeks.

Table 5: Online questionnaire content

I often get distracted by social media while I am working on something else.

Yes No [this option ends the survey]

Q1/ What is your age?

Q2/ What is your main country?

Q3/ What gender do you identify with?

Q4/ How do you feel about your procrastination on social media?

- Happy with it
- Somewhat happy with it
- Somewhat unhappy with it
- Unhappy with it

Q5/ on average, how many hours do you procrastinate on social media per day?

Q6/ on average, how many hours do you think other people (with similar age and gender to yours) procrastinate on their social media accounts per day?

Q7/ as percentages, how much of your procrastination time is spent on the following? (Please note that the total should be 100%)

- Social Networks: Facebook, Twitter, LinkedIn. : _____
- Media Sharing Networks: Instagram, Snapchat, YouTube. : _____
- Instant messaging: WhatsApp, Skype. : _____
- Other (please specify). : _____
- Total : _____

Q8/ on average, how many hours do you think your friends procrastinate on social media?

Q9/ To what extent do you agree with the following statements? (Strongly disagree...

I see myself as someone who...

- 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

Q10/ using the 1 to 5 scale below, please indicate how much each of the following statements reflects how you typically are: (Not 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

Q11/ To what extent do you agree with the following statements? (Strongly disagree...

[Note: the four statements corresponded to the four types of procrastination; avoidance, mood modification, escapism, emergence, respectively]

- I often procrastinate to avoid working on unpleasant or difficult tasks
- I often procrastinate to change my mood and feel better
- I often procrastinate to distance myself from real-life issues
- When I receive a notification, I check it and spend time on that despite having other tasks to perform

Q12/ To what extent do you agree with the following statements? (Strongly disagree...

[Note: the five statements corresponded to the five families of feature seen as procrastination triggers; notification, immersive design, surveillance of presence, social interaction and identity, respectively]

- I often delay working on my tasks because I am busy checking notifications on social media
- On social media, I spend time more than I initially intended due to seeing relevant content suggested to me automatically
- When I send a message to someone, I keep checking whether or not they received, read or replied my message
- I procrastinate on social media to maintain positive interaction with people and respond to them on a timely fashion
- When I am involved in chatting, I find it hard to stop procrastinating and complete my tasks

Here are some techniques that could help you to combat procrastination. Please select one or more of the following techniques that you think are more effective for each scenario:

Q13/ When you likely to procrastinate because of checking your notifications and engaging with their content, which of these software techniques would help you to combat procrastination? (You can choose more than one)

- Auto-reply; e.g. sending an auto-reply that contains some information such as I received your message, I will read and reply later when finishing my current work.
- Showing availability; e.g. when you receive notification, your contacts will be automatically informed that you are unavailable or busy.
- Suggestions; e.g. at the same time as the notification you receive a message suggesting how to avoid procrastination, e.g. showing how to mute notification and how to declare a Busy status.
- Other (please specify)

Q14/ when you spend more time on social media than you initially intended because of the relevant content that social media suggests to you, which of these software techniques would best help you to combat that? (You can choose more than one)

- Time restriction; e.g. restricting you from using social media beyond a maximum time or during certain hours of the day that you sat for yourself.
- Usage reminder; e.g. when you decide to spend 30 minutes on social media, you receive a reminder about the time that you have spent once you approach or exceed that limit.
- Usage feedback; e.g. at the end of the day, you can see statistics regarding the time you spent on social media and when such a usage conflicted with your other tasks listed in your online calendar.
- Other (please specify)

Q15/ When you send a message to someone and you keep spending time checking to see if they received, read or replied, which of these software techniques would help you to combat that procrastination? (You can choose more than one)

- Auto-reply; e.g. receiving an automated message from your contacts containing information such as I am currently busy and will try to read and reply when I am free around 5:00pm today.
- Priority; e.g. showing to you your priority tasks and to-do list so that you focus on them and avoid unnecessary checking.
- Other (please specify)

Q16/ When you procrastinate and reply to your contacts' requests in a timely fashion, mainly to maintain good relations or positive interaction, which of these software techniques would help you to combat that procrastination? (You can choose more than one)

- Usage feedback; e.g. at the end of the day, you can see statistics regarding the time you spent on social media and when such a usage conflicted with other tasks listed in your online calendar.
- Time restriction; e.g. restricting you from using social media beyond a maximum time or

during certain hours of the day that you sat for yourself.

- Auto-reply; e.g. sending an automated message to your contacts containing information such as: I am currently busy and will try to read and reply when I am free around 5:00pm today.
- Goal setting; e.g. enabling you to set your career or life-related goals, and help you to track your progress toward achieving these goals.
- Other (please specify)

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Q17/ When you procrastinate because you are chatting with your friends, which of these software techniques would help you to combat that problem? (You can choose more than one)

- Reminder to both users; e.g. while chatting, both of you receive a reminder telling that one or both of you may have other work to do as your online calendar suggests.
- Showing availability; e.g. your status will automatically change and declare that you have now become busy with other tasks so your friends would not expect you to continue chatting.
- Chatting timer; e.g. a time bar showing both users the time limit for the chat and the time spent already.
- Other (please specify)

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