Towards a healthy use of Facebook in everyday life

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Abstract: There has been extensive research about the negative effects of problematic Facebook use on the subjective well-being of people. Recently, several studies focused on measuring the positive effects on well-being by Information and Communication Technologies (ICT) enabled intervention to reduce everyday Facebook usage. This study conducts a literature review to explore the positive and negative aspects of Facebook use for different usage styles. Also, it extends to identify empirical evidence from existing studies about intervention models to reduce Facebook use, which can potentially benefit the subjective well-being of users.

Keywords: Problematic Facebook Use, Subjective Well-being, Social Media Addiction

1 Introduction

Social media technologies have had profound impacts on our lives and we are surely better connected now than ever before. Facebook is the largest social media company, with 2.6 billion monthly active users worldwide (Facebook, 2020). As of 2016, the average user was spending 50 minutes per day on Facebook products (Facebook, 2016). The primary motivation for Facebook use underlies in the need for self-presentation, belonging to a social group (Nadkarni and Hofmann, 2012), self-affirmation (Toma and Hancock, 2013) establishing and maintaining relationships (Joinson, 2008), and recently as a source of news (Müller et al., 2016). The frequent use and its relation with user characteristics can be explained by the Social Enhancement Theory ("rich gets richer") (McKenna et al., 2002) and the Social Compensation ("poor gets richer") (Valkenburg et al., 2005). The former proposes that high social skills people tend to use the platform to improve their social connections further. Conversely, latter theory proposes that people perceiving insufficient social skills likely use it as an alternative to face-to-face interactions.

The technological determinism theory postulates that a given technology can drive human behaviour in unexpected directions, while technological instrumentalism theory suggests that tools are neutral and their impact is dependent on the motivation of people developing and/or using them for specific purposes (Newport, 2020). Certainly, the invention of Facebook has been a huge advancement for better communication, however, the complex side effects of technology need to be handled in better ways. The purpose of this study is to find out if this connectedness is doing any good to users' well-being and what all measures can be taken for user behaviour change if it conflicts with subjective well-being.

The ubiquitous access to Facebook creates new self-control challenges for an increasing number of users (Hofmann et al., 2012; Masur et al., 2014; Xu et al., 2016). Meier et al. (2016) coins the term "Facebocrastination", i.e. procrastination induced by Facebook usage as users with low self-control keep checking it habitually and frequently, which impairs their ability to work on important tasks. Individuals could overuse the platform, develop an addiction and become driven by an uncontrollable urge to log on to and use social media (Schou Andreassen and Pallesen, 2014). Facebook use is considered to be a source of psychological distress (Bevan et al., 2014), as it overloads users with a high amount of information to consume (Campisi et al., 2012). Extensive usage may often lead to interpersonal conflicts in users' lives (Brailovskaia and Margraf, 2017).

Data security and privacy issues, accompanied by Facebook fatigue (Lee et al., 2019), sparked an online campaign #DeleteFacebook and millions of users discussed deleting Facebook. Although the campaign was unsuccessful, however, it made users more aware of security and privacy concerns (Mills, 2020). Despite its negative influence, people keep using it. This can be attributed to affective forecasting error by users, i.e.

while logging in to Facebook, people expect the network to bring them positive feelings while actually, the opposite happens (Allcott et al., 2020).

Based on empirical evidence from prior studies, we aim to explore the following research questions.

1.1 Research Questions

1. Can subjective well-being of users be enhanced by the reduction in Facebook use?
2. Is Facebook deactivation a feasible idea? What are associated potential benefits and/or losses?
3. What are the effects of different usage styles (active/passive) on well-being?
4. Is the reduction in daily Facebook use a better approach?

The rest of the paper is organized as follows. Section 2 defines terminologies to measure effects, briefly discusses theory and models aimed at behaviour change. Section 3 discusses the methodology of this study. Section 4 explores the answer to the proposed research questions. Section 5 explores intervention studies focused on behaviour change, alternatives for time spent on Facebook and limitations. Section 6 concludes the main points of paper.

2 Background

With Facebook becoming an essential communication tool in the everyday life of billions of users, several studies have investigated its effects on the well-being of people related to various usage patterns. This section discusses various terminologies to analyze the effects of Facebook use, theory and models for behaviour change which can be used to design an intervention for healthy Facebook use.

2.1 Subjective Well-Being (SWB)

Subjective well-being can be defined as a person's cognitive and affective evaluation of his or her life as a whole, including emotional reactions to events as well as satisfaction and fulfilment (Diener, 1994; Diener et al., 2002). In an individual's life, SWB mainly consists of happiness, life satisfaction and positive affect (Diener, 2009). Affect can be defined as a set of dimensions of human experiences of emotions, feelings and mood, which can be either positive (pleasure, excitement, arousal, relaxation) or negative (distress, displeasure, depression, sleepiness) (Russell, 1980).

2.2 Problematic Facebook Use (PFU)

Facebook use may become "problematic" when it becomes invasive to user's everyday life, which may lead to addictive-like symptoms and/or self-regulation difficulties (Griffiths et al., 2014; Marino et al., 2016), stressful situations (Xanidis and Brignell, 2016) and poor subjective well-being (Denti et al., 2012; Marino et al., 2018), often causing problems in school, work, friendships, and relationships (Lee et al., 2012).
To measure PFU, the most widely used scale in the literature is the Bergen Facebook Addiction Scale (BFAS) proposed by (Andreassen et al., 2012). Based on deriving from gambling disorder and gaming addiction measurements, BFAS assesses PFU through six items, each representing one core element of addiction, i.e. salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse.

2.3 Positive aspects of Facebook use

On the one hand, Facebook provides many benefits such as it reduces the cost of communication and information sharing, increases social capital (Ellison et al., 2007; Valenzuela et al., 2009). As per literature, individuals with more friends tend to have less stress, high subjective well-being (Nabi et al., 2013), low level of depression (Billedo et al., 2019; Lee and Cho, 2019; Takahashi et al., 2009), high perceived social support (Kim, 2014), and increased life satisfaction (Dienlin et al., 2017; Pang, 2018; Zhan et al., 2016). People often use Facebook to escape from daily stress and to experience positive emotions (Brailovskaia et al., 2019).

2.4 Negative aspects of Facebook use

On the contrary, Facebook may harm individuals' subjective well-being. A study by (Chou and Edge, 2012) identify evidence that frequent users believe that others are happier and more successful than them. Research suggests that it may reduce self-esteem (Alfasi, 2019; Appel et al., 2015; Vogel et al., 2014), trigger depression (Appel et al., 2016; Feinstein et al., 2013; McCrae et al., 2017), lower perceived social support (Burke et al., 2010; Seo and Hyun, 2018; Yang, 2016), decrease life satisfaction (Seo and Hyun, 2018) and reduce subjective well-being (Kross et al., 2013; Shakya and Christakis, 2017). Moreover, individuals using online media more than 1 hour daily reported lower well-being than those who spent less time online (Twenge and Campbell, 2019). These effects seem to be a by-product of upward social comparisons (feelings inducing envy) and the perception of Facebook as a meaningless activity. (Tromholt, 2016)

The contradictory results from existing studies make it difficult to evaluate if Facebook is harmful or useful for subjective well-being. Yang (2020) argues that activities such as writing (active use) and reading (passive use) must be explored independently to gauge overall effects. Specifically, unlike active use (posting updates or comments), passive use (browsing news feeds) may undermine well-being (Verduyn et al., 2015) and life satisfaction (Chen et al., 2016).

2.5 Theory and models for behaviour change

To aim for behaviour change of users to change media consumption habits successfully, habit theory should be considered. Habit theory states that habits develop when people give a response repeatedly in a particular context. Likewise, receiving rewards create a connection between context cues and response to form a habit (Neal et al., 2011). The primary reason to consider habit theory is that most of the times, users do not deliberately think whether they should engage in media use. Instead, media exposure is started unconsciously through media habits (LaRose, 2010; Meier et al., 2016). However, many interventions do not focus adequately to relate theory intuitively with the intervention strategies (Pinder et al., 2018).

To design an effective ICT based behaviour change intervention, COM-B model could be utilized (Michie and West, 2016). The model states that behaviour change can occur when the capability or opportunity or motivation of an individual is enough to engage them in a new behaviour as compared to potentially competing behaviours (West and Michie, 2020). Oinas-Kukkonen (2013) suggests that persuasive applications and systems target for changing human attitudes or behaviour with the help of software designs, which can be used to improve the health and well-being of users (Langrial and Ham, 2020). A behaviour change support system can be considered as a core component of a persuasive system, which could make use of web-based, mobile, ubiquitous or traditional information systems (Oinas-Kukkonen, 2013).

To positively influence user behaviour, persuasive technologies can be used (Jalowski, 2020). For instance, fitness trackers to support behaviour change have been popular and moderately effective in recent times (Niess et al., 2020). For better effectiveness of the intervention and associated technologies, persuasive strategies could be personalized as much as possible (Vargheese et al., 2020) and/or tailored to groups of similar individuals (Adaji et al., 2020). To design tailored persuasive strategies, demographic data of users such as gender, age and personality could be collected (Adaji et al., 2020), following privacy requirements specified by governmental and other regulations (Agyei and Oinas-Kukkonen, 2020).

3 Method

A literature search was conducted to identify studies with interventions to reduce Facebook usage using the following databases: Scopus, Google Scholar with the following keyword combinations: ((Social Media OR Facebook) AND (intervention)), (Problematic Facebook Use), (Effects AND Well-being AND Facebook), ((Facebook OR (Social Media)) AND Addiction), ((Quit OR Delete) AND Facebook).

The titles of about top 400 relevant results were screened for keywords. The skimming of abstract was done for 200 relevant results. After duplicates removal, a total of 29 articles remained for further analysis.

Further screening was performed to exclude articles that were not relevant specifically to our objective or were diverging in other thematic directions. Articles included were directly related to well-being, intervention or reduction in Facebook use. 11 articles were not relevant for this study and hence excluded. A total of 18 articles were analysed for complete review with relevant material from other articles as well.

Moreover, articles related to directions such as the personality traits of users, depression effects were not reviewed thoroughly. The search method focused on articles evaluating subject well-being of users, relating it with usage patterns of users. The articles consisted of involving various types of cross-sectional, longitudinal, correlation, causation, experimental design types of studies. Majority of studies were focused on studying the impact of excessive Facebook use based on correlational analysis, while only a few focused to identify causal inferences. Also, only a few studies were found which implemented the objective of behaviour change of users by intervention, for instance, to contain the Facebook addiction disorder. The different intervention features from the theory of behaviour change techniques used in the studies were analyzed and the effectiveness of the intervention was also included for the analysis, with suggesting to follow best practices for behaviour change-oriented intervention to increase the effectiveness of the intervention.

4 Results

There have been several intervention studies, some of which are correlational, some are experimental design and only a few studies attempted to identify causal inferences based on experimental design.

4.1 Better well-being by the reduction in Facebook use

To explore the first research question if improvement in subjective well-being is possible by a reduction in Facebook use, we analyze studies in this part. Current longitudinal correlation studies point to a negative impact of Facebook use on well-being. Kross et al. (2013) found Facebook use to predict a decline in life satisfaction proportionally, as measured by participants' in-vivo behaviour every day for two weeks. Conversely, Sagioglou and Greitemeyer (2014) experimented to find effects on mood by comparing 20 minutes of Facebook use, internet browsing and offline activity. The longer use in a single session was related to more negative mood afterwards. They expected that Facebook would make users feel better, but they reported feeling worse. This mood deterioration was caused due to the perception of it as a meaningless activity, which induces a feeling of time wastage.

In one of the few experimental studies, Tromholt (2016) demonstrated that users (in experiment or treatment group) not using Facebook for one week had a significantly high level of life satisfaction than the control group. The effect was moderated by the intensity of Facebook usage (the heavier the usage, the stronger the negative effect). This was the first study providing causal evidence of higher levels of cognitive and affective well-being by quitting Facebook, which results in higher life satisfaction and positive emotions. The causal effects were found to be higher for heavy users, passive users, and users who tend to envy others. Also, the effects were significantly greater for passive users, while marginal for active users.

4.2 Feasibility of deactivation based on potential benefits/losses

To find the answer to the second research question that if Facebook deactivation is a feasible idea, exploring its benefits and/or losses, we explore available studies in this section. (Lee et al., 2019) suggests #DeleteFacebook campaign, in which they aim to explore the social and psychological antecedents of Facebook fatigue to eventually cause a condition to deactivate Facebook forever.

In a longitudinal study by (Stieger and Lewetz, 2018), the experimental intervention methodology was with a 4-day baseline phase, 7 days intervention phase (no social media at all) followed by a 4-day post-intervention phase. In this experiment, users were not allowed to use any social media at all for one week. The results show that withdrawal symptoms such as heightened craving and boredom as well as social pressure to be on social media were increased during the abstinence period. A significant number (59%) relapsed at least once during the intervention. As an overall result, they suggest that on account of social media being

an integral part of everyday life, being without it leads to withdrawal symptoms (craving and boredom), likely relapses and social pressure to be available again. One aspect of abstinence is compensatory behaviour, which indicates that users do not always reduce their online communication behaviour, but rather switch to other channels.

Likewise, in another study by (Sheldon et al., 2011), 23% of users used Facebook in a 48 hours non-use experimental intervention, although instructed not to do so. Similarly, a study by (Baumer et al., 2013) suggested that almost half of users who deactivated their account voluntarily were found to subsequently return to Facebook after the experiment, representing a relapse effect. Baumer et al. (2015) suggests that feelings such as withdrawal and limited self-control associated with addiction disorders predicted an increased likelihood of recidivism i.e. repetitive relapsing in 99-day voluntary non-use. As an overall result, the impact of non-use suggests that participants experience withdrawal symptoms, relapses, which may cause negative feelings about themselves.

4.3 Effects of different usage style (active/passive) on well-being

Studies discussed in this section explore the effects of different usage style on well-being, i.e. third research question. Verduyn et al. (2015) found that 10 minutes of passive Facebook use led to a decrease in affective well-being over time. Verduyn et al. (2017) concluded that subjective well-being is certainly negatively associated with passive use, and as per little evidence, it may be positively associated with active use. Likewise, in a study by (Hanley et al., 2019) proposes "SNS vacation", i.e. intervention period for non-use of Facebook and Instagram for one week with no follow-up post-experiment. The amount of time on SNS was not found to be significantly correlated with any factors of subjective well-being. After the experiment, the SNS vacation resulted in lower positive affect for active users and had no significant effects for passive users, however no significant effects on life satisfaction. The results had a moderation effect of usage style that active users experienced decreased positive affect, while passive users did not. This result is contrary to popular expectation and it showed that for active users, SNS use can be beneficial. In terms of positive affect, active usage seems to be the most beneficial way of engagement. The study suggests that rather than absolute abstinence, users can be educated for the benefits of active usage style. Also, potential intervention to educate passive users to change engagement towards active usage to improve positive experiences.

The passive usage, related to higher upward social comparison (Wang et al., 2017) is considered to decrease subjective well-being (Wang et al., 2017; Gerson et al., 2017), however, the examination of a few studies provides mixed results. Hinsch and Sheldon (2013) study suggests that reducing or ceasing Facebook use increased life satisfaction but decreased positive affect too. A study by (Vanman et al., 2018) suggests that Facebook is stressful as found by lower stress levels in the experimental group after a Facebook break. Active users enjoy benefits from SNS such as social capital and self-esteem.

(Allcott et al., 2020) study suggests that deactivating Facebook not only freed up 60 minutes per day for the average user but also resulted to a significant reduction in news consumption, news knowledge and attention to politics, which in turn helped to reduce political polarization of views on policy issues. Deactivation caused small but significant improvements in self-reported happiness, life satisfaction. It changed people's perception of Facebook and it made them conscious to use it less in future, for instance, users reported avoiding news feeds and focusing only on important groups, and uninstalling smartphone application to use the platform only on the computer. Contrary to the suggested hypothesis from previous studies that Facebook may be beneficial for "active" users, this study found little statistical evidence for Facebook being more beneficial for active users as compared to passive users. This study found out that post-experiment Facebook usage patterns were lower for intervened users.

The results from this study had few interesting observations. First, they indicate that Facebook provides considerable benefits for its users. Because even after a four-week "detox", the participants spent substantial time. Secondly, to motivate users to give up Facebook even though temporarily, they had to offer large amounts of money to give up Facebook. The reason seems to be the extent of the heavy integration of Facebook in the everyday life of users that deactivating it permanently can cause indirect problems. This reason is evidence for users' lack of motivation to delete the account permanently.

4.4 Reduction in everyday Facebook use for better well-being

Having discovered that deactivating Facebook may not be the optimal strategy given its possible negative consequences, we explore answers to the last question if reducing the daily Facebook use a better approach for enhanced subjective well-being. An experimental study by Hunt et al. (2018) attempted to study the impact on well-being by limiting but not eliminating SNS platforms use for an extended duration. They limited the usage for intervened users to 10 minutes per day for three weeks as it seems realistic than complete removal of usage, including follow-up till one month after the experiment. As a result, they suggest that limited use has a direct and positive impact on subject well-being over time; significant reduction in loneliness and depression were found for people with different depression levels. Limiting social media use to approximately 30 minutes per day may help to enhance well-being. The reduction of social media, which enables us to connect with others, indeed helps people feel less lonely and depressed.

Similarly, the results in a study by (Brailovskaia et al., 2020) demonstrate that reduction of daily Facebook use by 20 min for two weeks not only significantly influences usage habits but also causes positive effects on subjective well-being and healthy lifestyle. The intervention reduced active as well as passive Facebook use, associated intensity, and level of Facebook addiction disorder. There had been a significant increase in life satisfaction of intervened users and a decrease in the depressive symptoms. One important observation from this study was that the effects were stable during the follow-up period of three months. This concludes that less time on Facebook may cause better well-being and a healthy lifestyle. Since complete quitting for longer duration can impact social life, they propose to reduce daily Facebook use as it can have positive effects, could increase offline activities and results can be sustainable for better well-being.

5 Discussion

On the one hand, active use can provide joy by getting recognition by others but it can also lead to concerns about one's reputation and living up to others' expectations (Weinstein, 2018; Yang, 2020). For instance, if not able to find favourable response from others, users may experience psychological discomfort, such as depression (Nesi and Prinstein, 2015). Individuals with a high number of online friends perceive online social support (Sinclair and Grieve, 2017), however, it may contribute to the development of FAD (Brailovskaia et al., 2019)

On the other hand, with passive use, while observing others' lives, users may promote positive stimulation such as inspiration or motivational force in life (Meier and Schäfer, 2018). Generally, a less number of users engage in downward comparison, which could result in self-enhancement, whereas relatively a large number of users engage in upward comparison which brings the opposite results (Yang, 2020). Studies suggest that life satisfaction decreases by experiencing envy or relative deprivation (Seo and Hyun, 2018). Upward social comparisons and feelings of envy negatively impact subjective well-being (Appel et al., 2016).

Considering the above results, users must be aware of the benefits of various usage patterns and based on them, they can change their use patterns for better well-being.

5.1 Intervention studies to contain Facebook addiction

While other studies discussed previously have been focused on studying the effects of the intervention on subjective well-being, only a few studies till date have attempted for user behaviour change and addiction control based on ICT enabled intervention.

One study by (Dogan et al., 2019) focused on the objective of investigating features of the Web-based intervention system on management of Facebook addiction. The experimental study was conducted with a sample of postgraduate users. This study discovered six addiction factors (relapse, conflict, salience, tolerance, withdrawal, and mood modification) and suggests that five intervention features (Self-monitoring, Manual

control, Notification features, Automatic control, Reward) could be used for management of Facebook addiction. The study found that relapse is the most important while mood modification is the least important factor. Furthermore, notification was identified as the most important, whereas self-monitoring as the least important feature. As per order of importance from highest to lowest, features such as automatic notification, automatic limitation, automatic reward, manual limitation, manual monitoring were identified. As per this, when notified of their high Facebook usage, users can automatically manage or restrict usage time. The study suggests that in the context of managing social media addiction based on Web-based intervention features, their research work could be useful. The limitations of the generalization of this study lie in the fact that all participants in the study were postgraduate users. Future studies could reveal if the effects may be assumed to be similar for ordinary users.

Another study by (Hou et al., 2019) conducted two sub-studies, with the first focusing on identifying the relationship between social media addiction and college students' mental health and academic performance, while the second study attempted to measure the effectiveness of an intervention in reducing social media addiction. The results from the first study reveal that social media addiction was negatively associated with mental health and academic performance with self-esteem as a moderator parameter. The second study found that intervention was effective to reduce social media addiction of students.

Previous studies on internet addiction intervention suggest that metacognitive beliefs about one's thinking and self-regulation have an influence on the problematic internet use and social media addiction (Casale et al., 2018; Caselli et al., 2018), which was the base for designing the intervention in the second sub-study. The results reveal that after the intervention, users experienced reduced social media addiction, improved mental health and self-esteem, and better sleep quality. Also, the intervened users found the intervention to be effective, reflecting the results from previous research that cognitive reconstruction, the reminder card technique, and daily reflections are effective methods in reducing Internet addiction (Young, 1999). Another positive effect was that users with intervention spent more time on learning engagement and experienced a better emotional state. The limitation of this study was the reason it being conducted in China, hence the local social media platforms were studied which did not involve Facebook. To study the similar effects, experimental study with Facebook could be conducted in future.

Based on a study with a large sample of users who deactivated Facebook, Baym et al. (2020) suggest that awareness of the automaticity of use, the value and content of Facebook, and how it makes them feel can help users to use Facebook in a better way. Scrolling the news feed was often described as a 'mindless' activity and after realizing this by the intervention, users were able to increase the sense of using Facebook.

5.2 Alternatives for time on Facebook

Brailovskaia et al. (2020) indicates that when users reduced their Facebook activity, they were able to utilize the newly available time to engage in physical activities, which can help users experience flow - a state of total involvement in the current task which leads to happiness, enjoyment and satisfaction (Csikszentmihalyi and Csikszentmihalyi, 1992). The less time spent on Facebook can help to increase the frequency of physical activity such as jogging or cycling. It can even help to decrease the number of daily cigarettes smoked (Brailovskaia et al., 2020). Physical activity buffers the negative effect of daily stress and enhances the well-being (Wunsch et al., 2017). While considering to implement restrictions on time spent on Facebook, the user must consider their hobbies or interests to use this time saved from Facebook. Substitution of engaging activities is necessary to remain away from Facebook because if that time is not reallocated to other activities, user can experience relapse, and to get triggered to use Facebook with heightened craving. Also as a result of distance from Facebook, users could get less news, if not substituted to other news sources.

5.3 Limitations

Brailovskaia et al. (2020) suggests that despite the significance of promising results of intervention on better well-being of users to reduce Facebook use by 20 minutes, this usage time reduction should not be considered as strictly the most effective one. The main reason is that there are no other studies with a similar design for

comparison of intervention effects. The future intervention approaches can experiment with different lengths of time of reduction in daily Facebook use to determine the most effective. Although this can depend on individual user behaviour characteristics. Also, the follow-up period with a long duration such as for six months or one year can be included. Also, as an overall effect, the female users seem to be impacted more as compared with male users for various impacts of Facebook use. There have been only a few studies identifying the causal inferences behind this phenomenon. Also, Hunt et al. (2018) suggest that as a result of limiting time on Facebook, intervened users tend to spend a lot more time on other applications, for instance, dating apps.

To design an intervention oriented for behaviour change, moderator such as the number of Facebook friends must be considered, which can help to analyze the ability of users to comply with restrictions as well as intervention success. With experimental analysis, an optimal level of use (similar to a dose-response curve) can be determined, which will allow for a better understanding of the amount of social media suitable for users. Applications that increase self-monitoring and awareness of use may be beneficial for behaviour change (Hunt et al., 2018). A study by (Hinsch and Sheldon, 2013) found that habitual checking is positively related while self-control is negatively related to Facebocrastination, which affects the well-being of Facebook users by causing procrastination induced by Facebook use.

6 Conclusion

Yang (2020) suggests that SNS use can be ambivalent in terms of subjective happiness. On the one hand, active and passive use may increase subjective happiness by confirmation obtained by others' approval and by vicarious gratification respectively. On the other hand, active and passive use may bring stress and anxiety in terms of others' reactions and induce a feeling of relative deprivation which can reduce subjective happiness respectively. As an overall result, the effects of SNS use on subjective well-being can vary as per the way an individual is using the platform. The repetitive usage can cause stress and user can consider taking a Facebook break (Kross et al., 2013).

As a conclusion, interaction, self-presentation and entertainment on Facebook forming active usage patterns are associated with better well-being, whereas consuming other's content with upwards social comparison is associated with poor well-being (Liu et al., 2019). Users can make themselves aware of a variety of Facebook features, by which they can engage in useful interactions with people so that they can reap the benefits of the social capital (Lee et al., 2014).

While individual practice such as mindful scrolling seems promising at first glance, which makes the user believe that they can keep their Facebook use in check. However, (Baym et al., 2020) argues that mindful scrolling cannot overcome the over-connection problems created by landscape trap of Facebook. They suggest that even after the user realizes Facebook as addictive, upsetting and undesirable, they find it difficult to turn away. They are pulled back when they try to avoid using Facebook (Vanman et al., 2018; Baym et al., 2020).

Authors such as (Alter, 2017; Newport, 2019) argue that social media apps are harmful and addictive, and hence be avoided altogether. Avoiding Facebook at all might be the optimal strategy to avoid negative effects of it. However, as proven from various experimental studies, due to the heavy integration of Facebook in everyday life, most of the users find it difficult to stay away from it for a long duration. Hence, rather than deactivation of Facebook completely, users must be aware of its beneficial effects and its relationship with their style of use. This could help users to align their daily usage patterns in a smooth and controllable way to gain the various benefits of the platform while not letting it cause stress due to disconnection.

While designing ICT based intervention for user behaviour change, to avoid failure of such technologies in offering long-term engagement, construal level and communication style must be considered as influence factors, which can help to achieve goal commitment and positive affect (Niess et al., 2020). However, long-term adoption of any intervention could be dependent on user motivation. Specifically, participants with stronger

learning goal orientation (focus on self-improvement and persistent when facing failure) would report a higher long-term behaviour change success rate. While on the other hand, participants with stronger performance goal orientation (focus on winning, failures can undermine intrinsic motivation) would report lower long-term success rate (Ham and Langrial, 2020). Conversely, data-driven persuasive technologies with a bottom-up participatory approach can improve the persuasive design of such technologies and simultaneously increase engagement of end-users to foster sustainable implementation (Keizer et al., 2020).

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