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The Effect of Time Spent Using Social Networking Sites through Smartphones on the Quality of Undergraduate Students' Mental Health

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By

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Abstract

The majority of people has already adapted to the unpredictably fast advancements in smartphones' (SPs) and social-networking sites' (SNS) technologies by using them on everyday basis (Jena, 2015). Always at hand, SPs are the most preferred way of connecting to SNS and if we add up the addictive nature of both SPs and SNS, young people tend to use them noticeably more than other age groups (Babdi-Akashe, Zamani, Abedini, Akbari & Hedayati, 2014, p. 94). Yet, little is known about the long-term effects of this newborn symbiosis on the quality of mental health. Thus, this research study focuses on exploring how the time undergraduate students spend on using SPs for connecting to SNS affects the quality of their mental health in regards to the following three dependent variables: 1. social interaction, 2. mental health, and 3. levels of technology induced stress (technostress), sleep deprivation, and loss of productivity. Hence, an online survey was distributed and the results were collected from 113 RIT Croatia and VERN students. The results revealed that those who spend more time using SPs for connecting to SNS tend to prefer virtual social interaction over real-life social interaction. In addition, they tend to suffer from sleep deprivation and loss of productivity as well. However, there was no significant effect of the independent variable on the incidence of symptoms or emotions related to the low quality of mental health. Thus, the results of this study support the previous research in this area and provide evidence for further research.

Keywords: smartphones, social-networking sites, technology, addictive, quality of mental health, undergraduate students, social interaction, technostress, sleep deprivation, loss of productivity, virtual, real-life, symptoms, emotions

Table of Contents

List of Tables

Chapter I - Introduction

Introduction to the Problem

Whether we like it or not, people are considered to be not only homo sapiens, but also homo socialis and homo ludens, which respectively means that social interaction and need for playful amusement are an important part of our personality (Helbing & Gintis, 2015, p. 3). Thus, the invention of smartphones (SPs) was in fact a revolution of its own, because it finally allowed us to involve in social activities and play wherever we are, as long as we can catch a signal with our all-in-one about palm-sized device – SP (Boyd & Ellison, 2007). At the same time, social networking sites (SNS), were continuously becoming more popular among people who had to use computers to connect to them at first (Boyd & Ellison, 2007). However, the moment the first iPhone was introduced to the world in 2007, SNS went through renaissance of their own, because this small hand held device enabled people to use SNS, not only to meet new people worldwide, but to interact and promote their social life with friends and families, anywhere, anytime in the world as well (Boyd & Ellison, 2007; Sarwar & Soomro, 2013, p. 222).

Yet, today most people, but especially young adults of student age (typical ages 18-22), build a strong or even an emotional bond to both, their SPs and SNS (Babdi-Akashe, Zamani, Abedini, Akbari & Hedayati, 2014, p. 94, Drussell, 2012). Social networking sites (SNS), such as Facebook, Twitter, Instagram, or Snapchat are web-based platforms for computers or smart devices, whose main purpose is communication and interaction among users (Drussell, 2012, p. 2). As such, they enabled a new way of social interaction among Internet users through computers and many smart devices, including SPs (Boyd & Ellison, 2007; Drussell, 2012, p. 2; Sarwar & Soomro, 2013, p. 222). However, it is SPs that people carry around all the time, where ever they go, thus they are the most preferred way of connecting to SNS (Sarwar & Soomro,

2013). Hence, this close relationship between SPs and SNS contributes even more to young people building a strong emotional bond to their SPs, because SPs and SNS enable them to communicate in real-time with not only their close friends, but also anyone anywhere in the world (Babdi-Akashe et al., 2014; Drussel, 2012; Sarwar & Soomro, 2013).

Accordingly, virtual social interaction has an increasing potential to become a substitute for real-life interaction and with that in mind, many doctors, psychiatrists, sociologists, psychologists, behaviorists, marketing experts, but also parents are being concerned with the possible addiction dimension of using SNS through SPs (Babdi-Akashe et al., 2014; Drussel, 2012; Sarwar & Soomro, 2013). As a result, both, SPs and SNS, although relatively new components of our lives, have now become an interesting and popular area for research, which is reasonable if we consider that the increasing trend in both, positive and negative changes in the quality of mental health of people, could in fact be related to the addictive attribute of using SNS through SPs (Babdi-Akashe et al., 2014, p. 95, Sarwar & Soomro, 2013). In addition, the information overload that we are all facing today, could change the very basis of our personality traits, our needs, our wants, our priorities and the sources of happiness, which we consider important (Babdi-Akashe et al., 2014; King et al., 2014; Przybylski, Murayama, DeHaan & Gladwell, 2013; Sarwar & Soomro, 2013). With its potential to modify our perception of reality and feelings of space and time, using SNS through SPs became either a comfort zone or escape from reality for many of us (King et al., 2014, p. 34; Sarwar & Soomro, 2013).

Regarding this particular research, it is important to mention that the SPs are only the most preferred way of connecting to SNS, probably because they are the most convenient way of connecting to SNS, since most people have them in their hands, pocket, or purse almost constantly (Sarwar & Soomro, 2013). However, this study's primary focus is to determine how

using SNS affects the quality of mental health of young adults.

Problem Statement and Rationale

The current trend of excessive usage of SPs has reflected itself on the quality of young people's lives in a way that through SNS they are tempted to prefer virtual social interaction over the real-life social interaction (Drussel, 2012; Runions, 2013; Sarwar & Soomro, 2013; Shapiro & Margolin, 2014;). This trend is relatively new and its full effect on the quality of mental health is an interesting subject for research. In addition, the rising trend of mental disorders that is especially evident in young people could be related to the lack of connection to real-life on the account of the virtual one (Cheever, Rosen, Carrier, & Chavez, 2014, p. 295; Drussel, 2012; King et al., 2014, p. 32; Sarwar & Soomro, 2013). Both, SPs and SNS are intentionally designed to look attractive and to be easy to use and if we add the fact that there is an app for almost everything we can imagine, all these could contribute even more to the addictive behavior toward the use of SPs for connecting to SNS (Cheever et al., 2014., p. 373, Drussel, 2012; Sarwar & Soomro, 2013). Moreover, this addictive behavior could result in technostress, sleep deprivation and loss of productivity in affected individuals (Jena, 2015; Sarwar & Soomro, 2013; Shapiro & Margolin, 2014). Bearing in mind that young people are most affected by these issues and that the future lies on their backs, the purpose of this quantitative survey study is to determine the effects of the time spent on using SNS through SPs on the quality of mental health of young adults through the sample of RIT Croatia and VERN undergraduate students.

Hypotheses

This study investigates the effect of time spent using SNS through SPs on the quality of mental health of RIT Croatia and VERN undergraduate students through proposing three hypotheses:

H_1: Students who spend more time using their SPs for connecting to SNS prefer social interaction over real-life social interaction more often than those who spend minimal time on same activities.

H_2: Students who spend more time using their SPs for connecting to SNS suffer from symptoms of low quality of mental health more often than those who spend minimal time on same activities.

H_3: Students who spend more time using their SPs for connecting to SNS suffer from high levels technostress, sleep deprivation, and loss of productivity more often than those who spend minimal time on same activities.

Chapter II – Literature Review

Introduction to the Literature Review

The strong emotional bond most people develop toward their SPs points to the conclusion that we have detached from human-centric world-view to live in things-centric paradise (Hodder, 2014, p. 19). As Hodder (2014) creatively tried to illustrate, technological advancements are no different from what telescopes and microscopes once were to us – they simply enable us to see new things or old things in a different way (p. 19). Today, the line of distinction between computers and SPs is becoming thinner every day (Sarwar & Soomro, 2013). As computers are getting smaller, the SPs are getting smarter, and if we add the fact that it is SP that we carry around in our purse/pocket wherever we are, then it should not surprise us they have become the primary source for communication, Internet connection, social interactivity, entertainment or for simple job-related purposes (Lin, Chiang, & Jiang, 2015, p. 1209; Sarwar & Soomro, 2013). Thus, it is not strange that the term "Nomophobia" (no-mobile-phone-phobia) was recently

adopted to address the magnitude of the impact these small hand-held devices can have on us emotionally, psychologically, and even physically (Shepherd, Parker & Steiner, 2015, p. 592).

Cheever, Rosen, Carrier and Chavez (2014) discovered that the participants in their study, when prohibited to use their mobile phones for instant access to the world of social interaction, have shown withdrawal symptoms such as pronounced anxiety or depression (p. 296). Further, it is very important to distinguish the excessive use of technology for educational or information-gathering purposes from using technology (including SPs) for social interaction, communication, and/or entertainment (Sarwar & Soomro, 2013). To explain, the participants in two recent research studies have not shown withdrawal symptoms when their access to Internet for facts-searching was restricted as did the participants who were prohibited of using it for social interaction, communication, and/or entertainment (Shepherd et al., 2015, p. 593; Cheever, et al., 2014, pp. 292-295). Furthermore, the strong connection to social interactivity through technology vehicles has many similarities to gambling addiction and thus it should be further researched as an addiction of its own (Shepherd et al., 2015, p. 593). To illustrate, people who tend to use technology for social interactivity, communication, and/or entertainment become restless if they are not allowed to do so, are unable to control those impulses on their own, and, as a result, they feel stressed out, anxious or even depressed (Alzayyat, Al-Gamal & Ahmad, 2015, p. 44).

On the other hand, Lepp, Barkley and Karpinski (2014) used a Satisfaction with Life Scale to show that the rising trend of the decline in the quality of mental health has a mediated relationship with the increasing trend of using SPs (p. 348). Not only did their study reveal a negative relationship between SPs use and the participants' academic performance, but it also indicated that the higher level of SPs' usage had a positive correlation with the higher levels of

anxiety (Lepp, Barkley & Karpinski, 2014, p. 348). Moreover, the research of Lee, Chang, Lin, and Cheng (2014) expands the issue by revealing that personality traits of the individual have an influence on the propensity to use SPs compulsively, which could further contribute to the high level of technostress (stress induced by technology) (p. 374). The following literature review will try to organize all the above-mentioned issues and their causes in a simple logical way. In the end consequences and solutions for these issues will be presented.

The Issues and Causes

Excessive Usage of SPs: Virtual World Substitutes for the Real one

In a world where all you have to do to get online is turn on your SP, it is hard not to get caught into the virtual reality and explore all of its innumerous benefits (Runions, 2013, p. 757). With SPs being the first thing that wakes us up in the morning and the last thing we touch before going to bed at night, it does not surprise that we tend to build a strong connection to this device (Shepherd et al., 2015, p. 592). However, the study that Alzayyat, Al-Gamal and Ahmad (2015) did on a random sample of 587 Jordanian university students using a demographic questionnaire, Young's Internet Addiction Test, Arabic Version of the Beck Depression Inventory, and multidimensional Scale of Perceived Social Support, imply that university students, especially those on first and second years of their studies, are most vulnerable to become addicted to Internet (pp. 44 - 45). Most of the addictive behaviors, such as alcohol/drugs abuse, smoking and gambling are forbidden at universities (Alzayyat et al., 2015, p. 44). At the same time, the use of technology, Internet, and even social networks is encouraged as it widely accepted that they can help students to stay up-to-date with their college responsibilities or even help them to finish them more easily and on time (Alzayyat et al., 2015, p. 44). Aside from that, Shapiro and Margolin (2014) argue that it is social and identity development that triggers the habitual use of

Social Networking Site technologies (SNS) in younger and older adolescents with young adults being not much different from them either (p. 12).

Accordingly, it seems that the strong connection young people develop toward using SNS is caused by their need to develop into strong and healthy adults one day (Shapiro & Margolin, 2014, p. 14). Shapiro and Margolin (2014) go on and explain that the motivation for habitual use of SNS in adolescents and young adults lies in their need to stay in touch, present themselves to others, plan events, and get to know other people better (p. 1). These findings were additionally supported by Drussell's research study, which investigated social networking and interpersonal communication and conflict resolution skills among college freshmen (Drussell, 2012). Drussell's research study revealed that the participants agreed they rely on SNS too much and spend an average of two to three hours using SNS per day (Drussell, 2012, pp. 37-38). In addition, 45% of the respondents reported they even ended an intimate relationship using SNS or text messaging (Drussell, 2012, p. 40). However, the results also suggested that the majority of the participants (68%, n=15) spend over two hours in face-to face social/leisure time, while only 9% (n=2) spend an hour or less (Drussell, 2012, p. 24). By now it is apparent that for these young people, SNS have an important role for building their interpersonal relationships, peer affiliation, friendship quality, and for the overall development of their identity (Shapiro & Margolin, 2014, p. 1).

Likewise, SNS can help them to express themselves, their worldviews, wishes, and enable them to show what they like or dislike, while providing an instant feedback (Shapiro & Margolin, 2014, p. 2). Hence, Shapiro and Margolin (2014) noticed that there are three main forces that make SNS attractive to young people: "the need to stand out" from the crowd, "the need to fit in" and "the need to learn about self" (pp. 2-12). In order to "stand out", they are

ready to share experiences that might be very private in their nature or to involve in actions that are dangerous or even against their beliefs, but all in order to develop an identity and become autonomous (Shapiro & Margolin, 2014, p. 2). Besides, they want to "fit in" to gain connections with which they are comfortable and to be accepted by their peers (Shapiro & Margolin, 2014, p. 2). The fact that SNS seem to amplify the sense of peer acceptance, makes them attractive to young people even more (Shapiro & Margolin, 2014, p. 9). Yet, it seems that the search for social and identity development they pursue is almost always done through the lenses of social comparison, which seems to have an enormous effect on the self-esteem of young adults (Shapiro & Margolin, 2014, p. 12). The authors believe that, in their quest for "learning about themselves", support groups can have huge impact on young individuals, especially those who have specific problems, chronic illnesses, and/or are members of ethnic or sexual minority (Shapiro & Margolin, 2014, p. 12). It is an opportunity for them to become a member of a group that reflects a part of their identity they wish to explore more thoroughly, which is of immense value for growing up into a healthy adult one day (Shapiro & Margolin, 2014, p. 2).

All in all, the results of Shapiro and Margolin (2014) study imply that the individuals with strong social skills offline were the ones with the strongest online connections and contacts as well (p. 9). On the other hand, the individuals with relatively weak offline social skills believed that their online relationships, although characterized by few close and many weak connections, have positively affected their personal sense of social relationships satisfaction (Shapiro & Margolin, 2014, p. 9).

By now it should be clearer why young people are so passionate about SNS technologies and how beneficial they are for their social and identity development. However, SNS have also changed the way young people engage with one another (Boyd & Ellison, 2007; Runions, 2013,

p. 751; Sarwar & Soomro, 2013). Today most of the social interaction young people do is through technology devices with SPs being the easiest and most preferred way of doing it (Adams, Daly & Williford, 2013, p. 100; Sarwar & Soomro, 2013). With real-life social interaction becoming less and less present in our lives giving virtual social interaction kind of superiority over the real-life one, it is hard to predict what are the consequences of such a shift in people's preferences (Sarwar & Soomro, 2013. The following literature review will try to address some of the issues that might be a result of the excessive use of SPs for social interaction.

The Decline in the Quality of Mental Health

Whether we admit it or not, SPs have become an essential part of our lives. In fact, we can hardly even imagine our life without them. With so many of their apps and functions, with an accent on SNS, SPs have outgrown their ancestors to become a sort of necessity of our life (Boyd & Ellison, 2007; Sarwar & Soomro, 2013). However, what is probably most important is the fact that people tend to create a special emotional bond to their SPs and everything they provide to the extent that SPs started to influence the quality of their lives and mental health (Babdi-Akashe et al., 2014, p. 94). In that light, it is hard to neglect the impact of ever-rising use of SPs and their innumerous functions to the turbulent rising trend of mental disorders (such as: generalized anxiety disorder, social interaction anxiety, obsessive compulsive behavior, etc.) which are considered to be the indicators of low quality of mental health (Babdi-Akashe et al., 2014, p. 94).

Bearing in mind that personality theories emphasize the close link between compulsive behavior and personality traits, and adding the fact that frequent use of SPs resembles addictive behavior, Lee et al. (2014) decided to further explore the following four personality traits: locus

of control, materialism, the need for touch, and social interaction anxiety. In this study, the first two personality traits served to provide a possible explanation of compulsive behavior, while the latter two were considered to be the underlying motivation/trigger for the use of SPs and the resulting pleasure, which further increases users' dependence on SPs. The purpose of their empirical quantitative survey study was to investigate if and how personality traits influence the compulsive use of SPs and if technostress is a latent side-effect of this compulsive behavior (Lee, Chang, Lin & Cheng, 2014, p. 374). The authors proposed a series of nine hypotheses out of which all, but one, were supported (Lee et al., 2014, pp. 374-376).

While the first four hypotheses were supporting the four above-mentioned personality traits and H_5 was trying to find a positive link between compulsive SP usage and technostress, the remaining four were focused on finding the gender differences and their propensity to be more or less influenced by one of the four personality traits that could lead to compulsive behavior (Lee et al., 2014, pp. 374-376). All hypotheses were supported, except H_9 which stated that it is more likely that materialism will lead to the compulsive use of SPs in males than it would in females. Lee et al. (2014) revealed a strong link between personality traits and the propensity to use SPs compulsively, which both lead to the overall higher level of technostress. However, they were not the only ones to investigate this relationship.

In their quantitative online survey study on 551 university students at Singapore university, Lin, Chiang and Jiang (2015) discovered that SPs users expressed more dependency on mobile technology, than did the users of regular cellphones (p. 1213). Although the focus of their study was put on the effect that excessive use of mobile technology could have on the individuals' quality of mental health (inability to control urges, anxiety, withdrawal symptoms and productivity loss) and they discovered a positive relationship to all four dependency

symptoms, nonetheless the results also revealed that extroverts who use SPs tend to suffer from productivity loss more than non-SP extroverts (Lin et al., 2015, pp. 2012-2014). In other words, extrovert users of SPs are at higher risk of developing overdependence to mobile technologies.

Lin et al. (2014) continue and explain that the results of their study suggest that the individuals with more pronounced sociability are more prone to mobile dependency as well, regardless of the type of phone they use (p. 2014). This study contributes even more to the importance of personality traits as possible predictors of one's dependency or addiction to SP use. In the same way, it implies that the dependency to devices, such as SPs or regular cellphones, for mobile technology has a negative influence on the overall quality of one's mental health.

By now it should be clear that using SPs for social interactivity could be an important predictor of addictive behavior (Salehan & Negahban, 2013, p. 2636). To support the previous claims even more, Przybylski, Murayama, DeHaan, and Gladwell (2013) argue that it is "fear of missing out" (FoMO) that is responsible for young people's stickiness to SNS and the devices that enable them (p. 1841). They define FoMO in young people as an extensive recognition of their peers' actions as a rewarding experience from which they are not a part of, but would like to be (Przybylski, et al., 2013, p. 1841). Moreover, these young individuals want to be constantly up-to-date with what others do and not to miss one thing (Przybylski et al., 2013, p. 1841). The authors' study also suggests that young individuals with a low level of self-perceived autonomy who are not satisfied with the level of their competence and social connectedness, are more prone to suffer from high level of FoMO (Przybylski et al., 2013, p. 1847). Consequently, their findings proved that FoMO can immensely impact individual's stickiness to SNS (Przybylski et al., 2013, p. 1847). This study introduced us to a new term "FoMO", which might have not

seemed relevant at the beginning, but proved to be of great significance for the deeper understanding of why some young people are more addicted to SNS, while the others seem to keep their urges in control.

Another recently adopted term in regards to addiction to SPs is "nomophobia", which is a short word for "no-mobile-phone-phobia"; a modern fear of not having a SP/cellphone near us, but no instant access to social media as well (King et al., 2014, p. 28). According to King et al. (2014) people who suffer from nomophobia show signs of agitation, rejection, anxiety, discomfort, disorientation and self-perceived lack of security when they are not near the device that enables them to involve in social interaction (p. 32). These symptoms were observed in both, healthy individuals and panic disorder (PD) sufferers and there was little or no difference between the two groups of participants in their study (King et al., 2014, p. 34).

In addition, the results of a similar quantitative survey study Cheever et al. (2014) did on 163 participants, suggest they became more anxious as the time they were not being able to use their devices was prolonged (pp. 292-295). Cheever et al. concluded that the participants' anxiety was not related to the device itself but rather to the fact that they were deprived of using them for SNS (p. 295). This only supports the previous implications that it is social interaction that drives changes in mental health of young individuals while SPs and other similar devices are nothing more but the enablers of these actions.

To contribute to this area of research even more, Babadi-Akashe, Zamani, Abedini, Akbari and Hedayati (2014) decided to determine if and how the type and intensity of addiction to SPs could influence the quality of mental health of young individuals on the randomly selected sample of 296 university students in Shahrekord, Iran (p. 95). The authors tried to find the link between six categories of addictive behavior and the corresponding nine categories of

what they named "mental health impairment" (Babadi-Akashe, Zamani, Abedini, Akbari & Hedayati, 2014, p. 95). The six categories of addictive behavior, which Babadi-Akashe et al. (2014) included in their research were: habitual, voluntary, dependent, involuntary, mandatory, and addictive behavior (p. 96). The nine categories of mental health impairment selected for the purposes of this study were: depression, obsessive compulsive disorder (OCD), interpersonal sensitivity, anxiety, psychosis, hypochondria, paranoia, hostility, and phobias (Babadi-Akashe et al., 2014, p. 96). These categories were chosen on the basis of previous psychological research related to behavioral problems in regards to addiction to SPs (Babadi-Akashe et al., 2014, p. 94). The accent was put on trying to find a positive correlation between involuntary addictive behavior and the lower quality of mental health among the participants (Babadi-Akashe et al., 2014, p. 96).

The results revealed that the addictive behavior toward SPs was most prominent for habitual, dependent, and voluntary behavior recorded by the participants (Babadi-Akashe et al., 2014, p. 95). Further, depression, OCD, and interpersonal sensitivity were most common among the participants. With the confidence interval of 0.99 and $P < 0.001$, the results of this study indicated the existence of an inverse relationship between the fine quality of mental health and addictive behavior toward the use of SPs (Babadi-Akashe et al., 2014, p. 95). In the end, Babadi-Akashe et al. (2014) conclude that the better quality of mental health in the individuals leads to a higher level of rationality, which further results in the less prominent addiction to SPs (p. 97). This study adds more evidence to the previous research, which suggested that the excessive use of SPs is a sort of addiction that is still not recognized well enough by the professionals (i.e. psychologists, psychiatrists, doctors, etc.) to be addressed as a serious problem so that it could be approached by appropriate curative methods. It also indicates that addictive behavior toward SPs

has a great impact on the quality of one's mental health. Further research in this area will probably reveal the true seriousness of this problem and the possible solutions.

Technostress, Sleep Deprivation and Loss of Productivity

The other area of concern, in regards to SPs, SNS, and their relevance to the quality of mental health, is most obvious in another relatively recent phenomenon – the elevated levels of technostress. Technostress was first coined as a term in 1984 by a psychologist Dr. Craig, who said that it is a stress induced by inability to cope with new technologies in either positive or negative way (Jena, 2015, p. 354). Dr. Craig further explained that technostress can manifest itself either in a form of having difficulties to accept new technologies or as an overdependence on new technology, which can even lead to a self-identification with the new technology (Jena, 2015, p. 354). In addition, Tarafdar, Darcy, Turel, and Gupta (2015) noticed that the constant and almost inevitable use of technology for job-related purposes, makes employees feel as if they are forced to simultaneously multitask on many devices around the clock (p. 62). To demonstrate, they did a survey on 600 professional users of computers, which revealed that 73% of them believed they could seriously damage their reputation at work, if they disconnect from all of their devices and do not respond immediately to work-related tasks (Tarafdar, Darcy, Turel & Gupta, 2015, p. 62). The work and information inflow overload, together with the constant distraction from alerts for new emails, messages or social media notifications, all contribute to elevated levels of technostress (Tarafdar et al., 2015, p. 62). To make the situation even worse, many participants, although they believed it would be great to disconnect from these irritating factors, in the end confessed they were unable to function normally when they did so (Tarafdar et al., 2015, p. 62). It seems people are not only addicted to their SPs, other IT devices, and SNS, but also to the stress they induce.

Tarafdar et al. study was furthered by Jena (2015) who did a study to examine the relationship between the compulsive use of SPs and technostress among 310 Indian students. An online and offline survey distributed to 600 Indian students consisted of 13 items that measured compulsive use of SPs and six items that measured the level of technostress (Jena, 2015, p. 356). 310 surveys were completed and the results indicated that more than one third of participants surf and browse for 5 hours a day, while almost one third use internet mobile services for 1 hour per day (Jena, 2015, p. 357). The results also indicated that the respondents prefer to use their mobile devices to browse SNS, rather than for academic purposes (Jena, 2015, p. 357).

In addition, the participants explained that SNS help them to "cool off" during their study time and make their time inside the institution less boring because they have a chance to connect to their friends and loved ones (Jena, 2015, p. 357). Facebook was the most preferred SNS for two thirds of participants, followed by an almost equal distribution of the rest of the participants between Twitter and Instant Messengers (Jena, 2015, p. 358). The overall results of the study suggest that SPs' and SNS' overdependence and compulsive usage can induce the level of stress in users, which could result in psychological distress in students (Jena, 2015, p. 360). In other words, since SPs are considered a new technology and their compulsive usage can induce stress in students, we can say that this study indicates a positive relationship between compulsive usage of SPs and technostress. With SPs and SNS being an important aspect of most students' life, it does not surprise that this study indicates that without them students can become easily irritated, frustrated, and impatient (Jena, 2015, p. 360). However, this study also suggests that the increased use of SPs for SNS can have a negative influence on the relationships with others (Jena, 2015, p. 360).

Yet, nowhere has this addictive side of technology been more obvious than in the review paper of Adams, Daly and Williford (2013), who noted that college students were hyper-attentive in their relationship toward SPs (p. 100). Not only did they confess it was almost impossible to disconnect from their SPs, but they also seemed to wake up upon their sound in a same manner mother reacts to a cry of her baby (Adams et al., 2013, p. 100). To support these evidences even more, Adams and Kisler (2013) did a quantitative survey study on 236 college students (p. 27). The results of their study showed that 47% of them reported they wake up to respond to a message, while 40% reported they wake up to answer a phone call after they fall asleep (Adams & Kisler, 2013, p. 27). They go on and explain that Facebook was the most prominent exogenous factor with the greatest impact on circadian rhythm of college students (Adams & Kisler, 2013, p. 25). In addition, Shapiro and Margolin (2014) discovered that SNS have a great impact not only on sleep quality, sleep deprivation, and the resulting daytime dreaming, but on academic performance as well (p. 3).

Sleep deprived students are less efficient at studying, paying attention and solving simple problems, but due to the constant disturbance from SNS notifications their inefficiency multiplies, because they constantly multitask between schoolwork and SNS (Shapiro & Margolin, 2014, p. 3). Thus, if we add sleep disturbance from SPs and SNS to the already mentioned technostress, we should bear in mind that sleep deprived and stressed college students suffer from great loss of productivity because of their strong connection to SPs and SNS. To understand better how SNS and SPs can negatively affect the overall academic performance of young adults could be of incremental value for improving the effectiveness of academic institutions. Thus, further research is suggested.

Consequences and Solutions

To decide which is more responsible for developing addictive-like behavior, SPs or SNS, would be similar to trying to prove that it was the chicken not the egg that came first. However, it is clear that both, SPs and SNS are very stimulating in their nature and that they complement each other very well. Without SPs, SNS would have never become that popular, because it is the ease of use and their portability that makes SPs a perfect platform for social interactivity. Besides, the addictive behavior they both induce in young adults could negatively influence the quality of their mental health, contribute to the overall high level of technostress, and make them sleep-deprived (Shapiro & Margolin, 2014). Internet is never asleep and young individuals have hard time coping with the fact that they might miss a lot while they are sleeping (Runions, 2013, p. 757). It is most probably FoMO that bothers them the most. Moreover, all these factors contribute to the loss of productivity, which further negatively reflects on their academic performance as well (Shapiro & Margolin, 2014, p. 3).

On the other side, sleep deprived and stressed out young individuals are easily distracted and less precautious, which makes them not only more prone to become less efficient at controlling their temper, but also possible victims of cyber-bulling attacks (Runions, 2013, p. 757). Thus, Shapiro and Margolin (2014) suggest that instead of constantly criticizing the role of SNS and SPs in young people's lives, we should embrace them as a fruitful source of information to learn more about young people's social and identity development (p. 13). They add that a longitudinal study, rather than cross-sectional, would be more appropriate for better understanding of true motivations behind young individuals' strong emotional involvement with SNS (Shapiro & Margolin, 2014, p. 14). They continue and emphasize that a longitudinal study could investigate the relationship between SNS and young people more thoroughly and be of

immense value for reading between the lines and detecting if some of them are in need of help (Shapiro & Margolin, 2014, pp. 14-15). This could enable the assigned experts to react to these warning signs and maybe even prevent possible suicides (Shapiro & Margolin, 2014, pp. 14-15).

Humans are social beings with the need to interact with others and the need to play embedded in their nature (Helbing & Gintis, 2015, p. 3). Thus, it does not surprise that young people show clear signs of addictive behavior toward something as stimulating as SPs and SNS. After all, they enable the world of social interaction in the most convenient and playful way. Yet, it is important to warn young adults on the importance of self-control regarding the excessive use of SPs for social interaction (Lin et al., 2015, p. 1214). The best way to do it would be through SNS, because in that case they would definitely not miss the warning (Alzayyat et al., 2015, p. 44). Just as we now have to click that we approve the use of cookies on every site we visit, young people could be warned about the consequences of the excessive use of their devices for SNS. They might find these warnings irritating at first, similar to how we are irritated by "cookies acceptance" but, in the end, this practice could make them more aware of the true seriousness of their dependency on SNS and its consequences on the quality of their mental health.

On the other side, Repetto and Riva (2011) emphasize the positive side of SPs and similar smart devices. They say that the use of Virtual Reality Exposure Treatments (VRET) in the combination with new Interreality (IR) software is more successful in treating generalized anxiety disorder, OCD, PD, social phobia and many other phobias, than are the best behavioral treatments, cognitive psychotherapy and psychopharmacology together (Repetto & Riva, 2011, pp. 31-32). The IR software seems to be exceptionally promising in overcoming the barrier between the virtual and real world by using 3D individual and shared virtual realities, personal

biomonitoring system (via sensors) and digital assistance provided by doctors (Repetto & Riva, 2011, p. 36). It might sound strange, but it seems that the technology advancements that we blame for the rise in the occurrence of mental disorders might also be the cure for the disease itself.

All in all, while literature review indicates that the consequences of the excessive use of SPs and SNS are pretty severe, we might hope that, as the time passes, further research will provide us with more explicit solutions to counteract them. For now, we should spread the awareness of their dangers and the importance of self-control, especially in adolescents and young adults, to make the use of SPs and SNS safer and less damaging to everyone.

Literature gaps

Because SPs and SNS are relatively new to our lives, the most prominent gap in the literature is that there are still not enough studies dealing with them. It is also important to mention that all of the studies were cross-sectional and none was longitudinal, which makes their results less substantive (Alzayyat et al., 2015, p. 44). Therefore, there is a need for longitudinal studies that would provide more thorough results on these issues. Further, most of the studies were done on the students who attended classes at the university, which leaves a possibility that those who were so addicted to their SPs and SNS that they even avoided classes because of their addiction, were not included in the results (Alzayyat et al., 2015, p. 44). Furthermore, since all studies that examined the relationship between personality traits and addictive behavior toward SPs or SNS found a positive correlation, Lin et al. (2015) suggest that further research is needed to explore the full nature of this relationship together with its effect on academic performance, quality of mental health, and work/study ability (p. 1214). The last suggestion comes from Alzayyat et al. (2015) who say that researchers should use SNS for distributing the surveys and

collecting the data, because it is the best way to avoid biased sample and catch the true representatives of SNS addicts (Alzayyat et al., 2015, p. 44).

Chapter III - Methods and Evaluation

Research Design

The research design of this study is a quantitative research method (or scientific method) as it is a proven method for testing theories and examining the relationship among variables (Creswell, 2009, p. 4). Thanks to the quantitative research method, the variables can be easily measured and translated into numerical data to be further analyzed using statistical methods (Creswell, 2009, p. 4). Using this research method enables the researcher to test the theories deductively, protect the research against biases, and leads to generalized conclusions, which are later on easy to replicate for other researchers as well (Creswell, 2009, p. 4). However, quantitative research method with its typical closed-ended questions in surveys as its main strategy of inquiry, uses post-positivist knowledge and neglects the participatory knowledge that could be obtained by using qualitative research method (Creswell, 2009, p. 17). Although quantitative research method makes testing or verifying theories very clear by identifying variables and relating them to hypotheses, it also leaves out the personal "touch" of bringing personal values of the participants to the research, which could increase the overall validity and reliability of the study (Creswell, 2009, p. 17). However, the quantitative method was chosen over qualitative, or mixed method because of the very nature of this research, which is characterized by the tested subjects who use their SPs for connecting to SNS. In other words, the best way to reach the highest number of targeted population was to reach it over something that resembles SNS and is as easy to use as SNS are. Thus, the choice has fallen to use email (RIT Croatia) and Intranet email (VERN) for distributing a survey that is easy to answer and can be

solved by using SPs, which Qualtrics platform enabled.

Further, a correlation design was used to assess how using SNS through SPs affects the quality of mental health of RIT Croatia and VERN undergraduate students (Creswell, 2009, p. 12). Furthermore, the scientific method enabled a better understanding of the relationship between independent and dependent variable (Creswell, 2009). Using SNS through SPs was used as an independent variable, while (depending on the hypothesis) the different effects of using SNS through SPs on the quality of mental health of RIT Croatia and VERN undergraduate students were used as a dependent variable. As a control variable, minutes/hours per day spent on using SNS through SPs were used. Finally, information gathered in this study were reduced into discrete sets that were used to investigate the effects of time spent on connecting to SNS through SPs on the quality of mental health of RIT Croatia and VERN undergraduate students through the three hypotheses:

H_1: Students who spend more time using their SPs for connecting to SNS prefer social interaction over real-life social interaction more often than those who spend minimal time on same activities.

H_2: Students who spend more time using their SPs for connecting to SNS suffer from symptoms of low quality of mental health more often than those who spend minimal time on same activities.

H_3: Students who spend more time using their SPs for connecting to SNS suffer from high levels technostress, sleep deprivation, and loss of productivity more often than those who spend minimal time on same activities.

Strategy of Inquiry

For this study, an online survey method via Qualtrics was used as a strategy of inquiry. This method was chosen as the best solution for immediate access to a large amount of relevant information in a cost- and time-efficient manner. The evidence from the survey was then used to generalize the information from the sample to the population at large. Qualtrics is a proven scientific online survey tool that not only serves for quick and easy distribution of surveys, but also generates the results and reports them as a spreadsheet/database with descriptive statistics and graphs for further analysis.

Target Population and Target Site

The participants of the study were all currently enrolled RIT Croatia and VERN undergraduate students between the age of 18 and 22, who possess a SPs and use it actively for connecting to SNS. This specific age group was chosen because the presumption of this study is that SNS have the most impact on young adults and the typical student starts college at 18 and should end his/her studies by the age of 22. Since there are students who decide to "go back" to college and might not fit into the profile of "young adults" and for convenience of the research, the target population was downsized to RIT Croatia and VERN undergraduate students between the age of 18 and 22 only.

The sample is convenient because both RIT Croatia and VERN students actively use their emails on a daily basis and are acquainted with using technology every day for the purposes of their college responsibilities, thus they were easily reached. According to (Croatian) Agency for Science and Higher Education's latest statistics, the total of all Croatian students was 178,676 in year 2013/2014 (Number of students by HEI and study type, n.d.). However, there are no statistics on age distribution among Croatian students nor statistics on how many of them have

SPs and use them actively for connecting to SNS. Thus, for purposes of this study the author used the above mentioned and explained sample that could easily be reached over emails and used elimination questions at the very beginning of the survey to be sure that the targeted population was reached. It would be much better to use all Croatian students between the age of 18 and 22 as a sample, but since Croatian universities still have a more hands-on approach and rarely use computers or emails, the response from the sample would most probably not be in accordance to the expectations of this research (Croatia country report, 2014).

Although Croatian students seem to be very dependent on their SPs and actively use them for SNS, nevertheless this can still not be applied to their use of technology for college purposes (Croatia country report, 2014, p. 6). All Croatian students are given an official university email, but since the institutions and professors rarely encourage their students to use them, students prefer to use commercial email providers (a.k.a. Gmail or Yahoo) for their personal needs. Overall, Croatian students are well below the EU mean in their operational Information Communication Technology (ICT) skills and use of computers for educational purposes, while they are above the EU mean in using SNS (Croatia country report, 2014, p. 6). All things considered, RIT Croatia and VERN undergraduate students, although convenient, are a better sample than all Croatian students would be.

Survey Design

The questions were yes/no, multiple choice, and multi response type. The logic behind these questions allowed for distinguishing between those participants whose *quality of life* (dependent variable) seems to be affected by the *daily minutes of use* (control variable) of *SPs for SNS* (independent variable) negatively, positively, or not at all. Here it is important to mention that some of the multi response type of questions (Q8, Q10, Q16, Q19, Q22, Q23, Q24,

Q25, and Q26) allowed the respondent to choose only if and what applied to his/her case. Thus, some of these questions remained unchecked/unanswered for some respondents. In these cases, the survey was still considered as "completed" and the results were used for further analysis.

Before the study was sent out, a pilot study on 5-7 volunteers from RIT Croatia and VERN faculty was conducted to ensure that the questions were clear and the wording was right. The results of this pilot study implied that the study was well written and easily understood, however they were not statistically analyzed further because the tested subjects did not fit into age groups of interests. In addition, a first set of three introductory questions were also elimination questions ensuring that only those between the age of 18-22 who possess a SP and use it actively for social interaction participated in the study.

The survey was designed in a way that after answering the first three elimination questions, the respondents either entered the remaining part of the survey or finished the survey. The full list of questions/complete surveys in both languages is available in Appendix A (p. 81) and B (p. 89) and the rationale behind dependent, independent, and control variables is presented in Table 1 (p. 38). As it can be seen in Table 1, the fourth question (Q4) enabled grouping the respondents into three categories:

1. Group 1 Minimal – those who use their SPs for connecting to SNS for half an hour or less per day
2. Group 2 Moderate – those who use their SPs for connecting to SNS for more than half an hour, but less than two hours
3. Group 3 Excessive – those who use their SPs for connecting to SNS for three hours or more

The remaining 22 questions in the survey were designed to either support or reject the three proposed hypotheses. The rationale behind this mechanism is explained in Table 1 (p. 38).

With authors' approvals, for the basis of the survey's questions only already existing, peer-reviewed, and tested for reliability and validity questionnaires were used. Authors' approval was asked for and received from Salehan and Negahban to use their questions to measure social network intensity, the scale of SP addiction, and the use of SPs to access SNS (Salehan & Nagahban, 2012, p. 2635). These questions were needed for addressing the issue of mental health quality in regards to the frequency of using SPs for connecting to SNS and its importance to the participants, which were crucial issues for addressing all three hypotheses (H_1, H_2, and H_3). In addition, authors' approval was asked for and received from Yu-Kang Lee, Chun-Tuan Chang, You Lin, and Zhao-Hong Cheng to use their questions for investigating the compulsive usage of SPs for connecting to SNS and in regards to (H_3) technostress, academic performance, and sleep deprivation (Lee et al., 2014, p. 380). Finally, authors' approval was asked for and received from King et al. to use their mobile phone use questionnaire to determine how dependence on SPs and SNS affects mental health of the participants in regards to symptoms and feelings that indicate the low quality of mental health (H_2) (King et al, 2014, p. 30).

On the other side, author's approval was asked for, but never received from John J. Drussel to see how using SPs for connecting to SNS affects the perception of reality (H_1) of the participants. The email asking for permission was sent several times, but the person responsible for getting the approval at St. Catherine's University of St. Thomas School of Social Work, Mrs. Emily Asch (ejasch@stkate.edu), explained she was unable to reach the author. However, she also informed that Drussel's study was published publically and that the materials form the study can be used for other research as long as the source is properly cited. Thus, with the approval

from most of the authors, 26 survey questions (Q) were carefully selected, modified to the relevance of the topic (with author/s' approval), and a final survey was designed in accordance to research objectives and literature review.

Procedure

The survey study was self-reporting and cross-sectional. First, the English version of survey was sent to 806 RIT Croatia undergraduate students, out of which, according to Marija Šušak from RIT Croatia Academic Affairs Office, 518 were in the age group between 18-22 years. The response rate for RIT Croatia survey was 20% (N = 163) out of 806 students. Out of which 51% (N = 84) were in the age group between 18-22 years. That means that the response rate of targeted population was 16.2%. However, only 74 surveys were finished and used for the purposes of this study, which means that the sample consisted of 14.3% of the whole RIT Croatia targeted population. Due to the fact that the both times the survey was distributed was during Easter holidays, this could be considered a reasonable response rate. In addition, 33% of them were male and 67% were female. However, gender differences were not taken into consideration for the purposes of this study, but rather time spent on using SNS through SPs.

Next, the Croatian version of survey, which the author of this study translated from the original English version into her native tongue, was sent to 2200 VERN students, out of which 1760 were undergraduate students (80%). According to VERN's Associate Dean Višnja Grozdanić, out of 1760 undergraduate VERN students, only 28% were born 1996 or later. Thus, the survey reached 457 VERN students in the age group between 18-22 years. The response rate for all VERN students was 160 (7.3 % of 2200). Out of these 160 students, only 40 (25% of 160) were in the targeted age group, actively used SPs for connecting to SNS, and finished the survey. Thus, only 8.4% (of 457) of targeted VERN population was used as a sample for the purposes of

this study. In addition, 20% of them were male and 80% were female. The author was warned upfront by VERN's Associate Dean Višnja Grozdanić that VERN's students have an aversion to "surveys" and that the response rate will most probably be low. Even though the author politely asked for another distribution of the survey, VERN's Associate Dean Višnja Grozdanić refused it, explaining that it would make no difference to the response rate. Out of the three elimination questions, the second one referring to the age was responsible for the low response rate in case of VERN. Overall, in the Complete Sample (RIT Croatia and VERN students combined) there were 113 respondents who qualified for being considered as the valid representative of the sample. Out of 113, there were 32 (28%) males and 81 (72%) females.

Overall, the 113 respondents who were used as a sample for this research, are 0,0006% of 178,676 of all Croatian undergraduate students. At the standard confidence interval of 5, the ideal sample size would be 383 of the respondents. This is means that the sample used in this research was not statistically significant, because the effect size of this research is poor and as such weakens the strength of the conclusions about group differences and/or relationships among the variables (Cresswell, 2009, p. 167). However, as explained earlier in this paper in Target Population and Target Site section (p. 28), all Croatian students rarely, if ever, use their emails and for that reason would be hard to reach with an online survey to comprise a better and statistically significant sample.

The site of the study was Croatia (City of Zagreb and Dubrovnik campuses for RIT Croatia and Zagreb for VERN students). Overall, a single-stage random sampling was used on the basis of the validity of the surveys completed (Creswell, 2009, p. 155). By using a random sampling method, we provide each participant with an equal opportunity to be selected from the

population, which makes the sample a valid representative of the population at large (Creswell, 2009, p. 155).

With RIT Croatia's Dean Donald Hudspeth permission, the survey was administrated through a mailing list of RIT Croatia's information database of students to all RIT Croatia undergraduate students and with VERN's Associate Dean Višnja Grozdanić permission, the Croatian version of the survey was distributed through Intranet mailing system of VERN University to all VERN students. The original English version of the survey was translated by the author to her native Croatian for VERN's students, since they are mostly Croats. To ensure that the survey is completed in a proper manner, an email with detailed instructions and a link to the survey was sent to the participants. To secure confidentiality and transparency, the study was anonymous the moment participants entered the survey link. To encourage students' participation, along with the instructions, an introductory email was written in a creative way so that it was supposed to tickle students' imagination, make them feel the relatedness to the problem, and give them a moment to think about the emergency of the problem relevant to their personal connection to it. The copy of introductory emails for both universities can be found in Appendix C (p. 98) for RIT Croatia and Appendix D (p. 100) for VERN.

Data Collection

The data was collected directly from Qualtrics as a ".sav" file downloaded for further analysis of descriptive statistics. For data analysis, a Statistical Package for Social Science (SPSS) and Microsoft Excel were used.

Data Analysis and Measurement Instruments

The frequencies of the overall responses from Qualtrics were further analyzed by using descriptive statistics in SPSS and Microsoft Excel. Descriptive statistics helped in identifying the true impact of time spent on using SNS through SPs on the quality of mental health of RIT Croatia and VERN undergraduate students. Further, exploratory factor analysis was done on the results of descriptive statistics. This enabled the grouping of relevant information into three groups – Group 1 (labeled Minimal) with individuals who use SNS for half an hour or less per day, Group 2 (labeled Moderate) with individuals who use SNS for more than half an hour, but less than two hours, and Group 3 (labeled Excessive) with individuals who use SNS for three hours or more. Furthermore, when the groups were formed, they were tested against each question and the relevant hypothesis accordingly, to see if there was a negative, positive, or no effect at all on hypothesis' variables related to the quality of mental health. For that purpose, a series of one-way ANOVA tests were used to test the difference between the means of all three groups - the difference between Group 1, 2, and 3 all together, and between the Group 1 and Group 2, Group 1 and Group 3, and between Group 2 and Group 3 (Pyrczak, 2010, p. 127). One-way ANOVA was chosen among other statistical tests as it enables finding statistically significant differences between the means of three or more independent variables (which is the case with this research) and proving if the hypothesis is correct for a given pair of means (Pyrczak, 2010, p. 128).

CHAPTER IV. - Results

The Key Determinant: Time Spent on Connecting to SNS through SPs

The results of the survey revealed that among RIT Croatia undergraduate students, 8 of them (11%) used their SPs for connecting to SNS for half an hour or less per day, thus 11% of RIT Croatia undergraduate students were selected to Group 1 Minimal. Then, 35 (48%) of RIT Croatia undergraduate students used their SPs for connecting to SNS for more than half an hour, but less than two hours per day, thus they were selected for the Group 2 Moderate. Lastly, out of 73 RIT Croatia undergraduate students 30 (41%) of them used their SPs for connecting to SNS for three hours or more, and were therefore selected to Group 3 Excessive.

On the other side, only two (5%) of VERN undergraduate students used their SPs for connecting to SNS for half an hour or less per day and fell into category of Group 1 Minimal, while 18 (45%) of them used their SPs for connecting to SNS for more than half an hour, but less than two hours per day and fall into category Group2 Moderate. An interesting thing is that there were 20 (50%) VERN undergraduate students who used their SPs for connecting to SNS for three hours or more and fell into category of Group 3 Excessive. These results imply that there is a propensity of VERN students to use their SPs for connecting to SNS more excessively than RIT Croatia students. However, the results from both samples point into direction that there are less students who use their SPs for connecting to SNS for less than half an hour a day (Group 1) than there are students who use SPs for connecting to SNS for more than half an hour (Group 2 and Group 3 combined).

Overall, in a combined sample of 113 RIT Croatia and VERN undergraduate students, 9% (10) were in Group 1 Minimal, 47% (53) were in Group 2 Moderate, and 44% (50) were in

Group 3 Excessive. These combined results imply that most of the Croatian students are still using their SPs for connecting to SNS in moderation.

Measure of Key Variables

Key Variables were selected according to the relevance to the hypotheses and the nature of the question itself. For ease of understanding Table 1 on the following pages presents survey items (questions) for independent and dependent variables.

Table 1.

Survey Items for Independent and Dependent Variables

Independent Variable	Dependent Variable	Question	Question Number
H_1: The amount of time students spend on using SNS through their SPs	Preferring virtual social interaction over real-life social interaction (Salehan & Nagahban, 2012; Drussel, 2012)	What is the average amount of leisure/social time per day you spend face-to-face with others?	Q5
		Do you post/like/comment on SNS more than three times per day?	Q6
		Do you receive more than three likes/comments per day on your posts on SNS?	Q7
		SNS' friends I've never met are as important to me as real friends I rely too much on SNS to stay in touch with people I've improved my ability to communicate and work out problems by using Facebook I've unfriended someone on SNS instead of talking about it Social networking has made a positive impact on society Social networking makes friendships stronger	Q8_1 Q8_2 Q8_3 Q8_4 Q8_5 Q8_6
		Have you ever ended an intimate relationship with someone by sending a message on Facebook or any other SNS?	Q9
		I make an effort to spend real time with friends I solve problems with friends face-to-face People who rely on social networking are losing ability to talk with others Communicating using social networking is generic and impersonal It's easy to take things the wrong way during social networking	Q10_1 Q10_2 Q10_3 Q10_4 Q10_5
		I prefer to keep in touch with others… By using SNS By talking in person By some other method	Q11
		I prefer to let someone know I'm upset by… By talking in person By posting text/picture/changing status on SNS By not doing anything	Q12
		When I do not have my SP, I feel disconnected	Q13
		I feel out of touch when I haven't logged onto my SNS for a day	Q14

Independent Variable	Dependent Variable	Question	Question Number
H_2: The amount of time students spend on using SNS through their SPs	Suffering from symptoms of low quality of mental health (King et al., 2014)	I find it hard to control my use of SP for connecting to SNS	Q17
		I check for missed calls/messages/posts/comments/likes during the night, when I am supposed to sleep, or if I accidently wake up during the night	Q18
		Do you often feel rejected when no one likes/comments your post/photo/status on	Q20
		Do you feel low self-esteem, depressed, or anxious when you see that your friend has received more likes/comments on his/her post/photo/status on SNS than you?	Q21
		I often get angry if someone interrupts me while I use my SP for SNS I try not to check my SP for SNS activity so often, but I fail I use my SP for SNS even when talking or eating with others	Q22_1 Q22_2 Q22_3
		I keep my SP on 24 h a day I feel like my SP is ringing or vibrating (a.k.a. SNS notifications coming), but it isn't Others complain about me spending too much time on my SP for SNS I feel uneasy in places where mobile phone usage is prohibited I feel as if I am with someone when I use my SP for SNS	Q23_1 Q23_2 Q23_3 Q23_4 Q23_5
		How do you feel when your SP has no minutes, battery charge, or is out of range? Anxious, Distressed, Agitated, Afraid, Disoriented, Normal	Q24_1, Q24_2, Q24_3, Q24_4, Q24_5, Q24_6* *respectively
		Have you experienced any of the following symptoms or emotions due to not being able to use SNS for some period? Tachycardia, Tremors, Sweating, Changes in respiration, Depression, Loneliness, Rejection, Panic	Q25_1, Q25_2, Q25_3, Q25_4, Q25_5, Q25_6, Q25_7, Q25_8* *respectively

Independent Variable	Dependent Variable	Question	Question Number
H_3: The amount of time students spend on using SNS through their SPs	Suffering from:		
	High levels technostress (Lee et al., 2014)	I am forced to change habits to adapt to new developments in SP and SNS technologies	Q16_1
		I feel my personal life is being invaded by SPs and SNS technologies	Q16_2
		I am threatened by people with newer SPs and SNS technology skills (a.k.a. I need to have the newest version of iPhone and be active on most popular SNS)	Q16_3
		I have to sacrifice my personal time to keep current on new SP and SNS technologies	Q16_4
	Sleep deprivation (Lee et al., 2014)	I check for missed calls/messages/posts/comments/likes during the night, when I am supposed to sleep, or if I accidently wake up during the night	Q18
		I have hard time falling asleep because I wonder what's going on SNS	Q26_1
		I am often sleep deprived because I spent too much time on SNS	Q26_1
	Loss of productivity (Lee et al., 2014)	Using SP for SNS takes a lot of my time, which I should have spent on studying or working	Q15
			Q19_1
		I risked an important relationship, a job, an academic or career development opportunity because I overuse my SP for SNS	Q19_2
		I can't concentrate in class because I have to check my SP for SNS activity	

Descriptive Statistics

H_1 Descriptive Statistics

H_1 Sample 1 (RIT):

Regarding H_1, the descriptive statistical analysis revealed that most people (60.3%) from Sample 1 spend three hours or more (Q5), some of them (35.6%) spend more than half an hour, but less than two hours. while only 4.1% spend less than half an hour in face-to-face contact with others. Next, 48.6% of the respondents post/comment/like on SNS more than three times per day

(Q6), while only 38.4% of them gets more than three posts/likes/comments on SNS (Q7). This means that there are more of the respondents who are less active on SNS than there are those who are intensively active. In addition, only 26.4% of respondents ended an intimate relationship with someone over SNS (Q9), meaning that personal matters are still mostly (73.6%) resolved face-to-face. This finding was only more supported with Q10_1, Q10_2, and Q10_5 where 78.1% make an effort to spend real time with friends, 78.1% solve problems face-to-face, and 68% think that it is easy to take things the wrong way over SNS. Moreover, 49.3% think that those who rely on SNS for communication are losing the ability to talk with others (Q10_3) and 34% think that communication over SNS is generic and impersonal (Q10_4). In addition, 74% of respondents prefer to keep in touch with others by talking in person, while only 19.2% use SNS for that purpose.

As expected, 69% of them prefer to let others know they are upset by talking in person (Q12), while the rest of the sample uses some other method (only 8.2% use SNS for that purpose). On the other side, only 5.5% think of their SNS' friends (such as Facebook friends) they have never met before as important as real friends (Q8_1), 43% of the respondents think they rely too much on SNS to stay in touch with others (Q8_2), 34.2% think that SNS improved their ability to communicate and solve problems with others (Q8_3), 28.8% think that SNS made a positive impact on society (Q8_5), 26% think that SNS make friendships stronger (Q8_6), while only 21.9% unfriended someone on SNS instead of talking to him/her (Q8_4). There are 54.9% (Vs. 45.1%) of the respondents who do not feel emotionally and/or physically disconnected from the world/people if they have no SP (Q13) and 50.7% (Vs. 49.3%) feel out of touch if have not logged onto their SNS for a day (Q14).

H_1 Sample 2 (VERN):

In regards to H_1, the descriptive statistical analysis implies that most people (68.3%) from Sample 2 spend three hours or more (Q5), some of them (26.8%) spend more than half an hour, but less than two hours, while only 4.9% spend less than half an hour in face-to-face contact with others(Q5). Next, only 39% of respondents post/comment/like on SNS more than three times per day (Q6), while 68.3% of them gets more than three posts/likes/comments on SNS (Q7). This means that there are more of the respondents who are intensively active on SNS than there are those who are less active. In addition, only 22% of respondents ended an intimate relationship with someone over SNS (Q9), meaning that personal matters are still mostly (78%) resolved face-to-face. This finding was only more supported with Q10_1, Q10_2, 10_3, and Q10_5 (respectively), where 53.7% make an effort to spend real time with friends (10_1), 58.5% solve problems face-to-face (10_2), 70.7% think that those who rely on SNS for communication are losing the ability to talk with others (Q10_3), and 73.2% think that it is easy to take things the wrong way over SNS (Q10_5). In addition, 48.8% think that communication over SNS is generic and impersonal (Q10_4).

From these results, it is only logical that 90.2% of respondents prefer to keep in touch with others by talking in person, while only 2.4% use SNS for that purpose (Q11). As expected, 43.9% of them prefer to let others know they are upset by talking in person or they even do not anyone to know about it (39%) (Q12), while the rest of the sample uses some other method (only 14.6% use SNS for that purpose). On the other side, only 7.3% think of their SNS' friends (such as Facebook friends) they have never met before as important as real friends (Q8_1), 26.6% of the respondents think they rely too much on SNS to stay in touch with others (Q8_2), 17.1%

think that SNS improved their ability to communicate and solve problems with others (Q8_3), (17.1%) think that SNS made a positive impact on society (Q8_5), 12.2% think that SNS make friendships stronger (Q8_6), while only 51.2% unfriended someone on SNS instead of talking to him/her (Q8_4). There are 63.4% (Vs. 36.6%) of the respondents who feel emotionally and/or physically disconnected from the world/people if they have no SP (Q13) and 57.5% (Vs. 42.5%) feel out of touch if have not logged onto their SNS for a day (Q14).

H_1 Complete Sample:

Relevant to H_1, the descriptive statistical analysis revealed that most students (63.2%) from Complete Sample spend three hours or more (Q5), some of them (22.5%) spend more than half an hour, but less than two hours, while only 4.4% spend less than half an hour in face-to-face contact with others (Q5). Next, 45.1% of the respondents post/comment/like on SNS more than three times per day (Q6), while 49.6% of them gets more than three posts/likes/comments on SNS (Q7). This means that there are overall more of the respondents who are moderately active on SNS than there are those who are intensively active. In addition, only 24.8% of respondents ended an intimate relationship with someone over SNS (Q9), meaning that personal matters are still mostly (75.2%) resolved face-to-face. This finding was only more supported with Q10_1, Q10_2, 10_3, and Q10_5 (respectively), where 69.3% make an effort to spend real time with friends (10_1), 71.1% solve problems face-to-face (10_2), 57% think that those who rely on SNS for communication are losing the ability to talk with others (Q10_3), and 70.2% think that it is easy to take things the wrong way over SNS (Q10_5). In addition, 39.5% think that communication over SNS is generic and impersonal (Q10_4).

From these results, it was expected that 79.8% of respondents prefer to keep in touch with others by talking in person, while only 5.4% use SNS for that purpose (Q11). In addition, 62.2% of them prefer to let others know they are upset by talking in person or they even do not anyone to know about it (19.8%) (Q12), while the rest of the sample uses some other method (only 5.3% use SNS for that purpose). On the other side, only 6.1% think of their SNS' friends (such as Facebook friends) they have never met before as important as real friends (Q8_1), 41.2% of the respondents think they rely too much on SNS to stay in touch with others (Q8_2), 28.1% think that SNS improved their ability to communicate and solve problems with others (Q8_3), 24.6% think that SNS made a positive impact on society (Q8_5), 21.1% think that SNS make friendships stronger (Q8_6), while only 32.5% unfriended someone on SNS instead of talking to him/her (Q8_4). Overall, 51.8% (Vs. 48.2%) of the respondents feel emotionally and/or physically disconnected from the world/people if they have no SP (Q13) and 46.8% (Vs. 53.2%) feel out of touch if have not logged onto their SNS for a day (Q14).

H_2 Descriptive Statistics

H_2 Sample 1 (RIT):

In regards to H_2, the descriptive statistical analysis implies that 44.4% of the respondents from Sample 1 are not sure if they can control the use of their SP for connecting to SNS, while 19.4% think it is hard for them to control it and 36.1% think they have control over it (Q17). During the night 45.8% of the respondents check their SPs for missed posts/comments/likes sometimes, while 15.3% always do it and 38.4 never do it (Q18). Only 32.4% of the respondents feel rejected if no one likes/comments their post on SNS (Q20), while 15.3% feel low self-esteem, depressed, or anxious when they see their friend received more likes/comments on SNS

than they did (Q21). Even 54.8% of the respondents try not to check their SP for SNS activity(Q22_2), but they fail, while 34.2% check their SPs for SNS even when talking and eating with others(Q22_3). Yet, only 11% get angry if someone interrupts them while they use their SPs for SNS(Q22_1).

In addition, 58.9% of the respondents keep their SPs on 24 h a day (Q23_1), 34.2% think they hear their SP ringing/vibrating even when it is not (Q23_2), others are complaining about them spending too much time on their SPs for SNS for 8.2% (Q23_3), while 16.4% feel uneasy in places where mobile phone usage is prohibited (Q23_4) and 24.7% feel as if they are with someone when they use their SP for SNS (Q23_5). When their SP has no minutes, battery charge, or is out of range, 24.7% feel anxious (Q24_1), 8.2% feel distressed (Q24_2), 23.3% feel agitated (Q24_3), 5.5% feel afraid (Q24_4), 16.4% feel disoriented (Q24_5), while most of them (42.5%) feel normal (Q24_6). Lastly, the following percentage of respondents experienced symptoms/emotions related to low quality of mental health when they were unable to use SNS for some reason: 1.4% tachycardia (Q25_1), 1, 4% tremors (Q25_2), 2.7% sweating (Q25_3), 1.4% changes in respiration (Q25_4), 2.7% depression (Q25_5), 21.9% loneliness (Q25_6), 5.5% rejection (Q25_7), and 9.6% panic (Q25_8).

H_2 Sample 2 (VERN):

Regarding H_2, the descriptive statistical analysis revealed that 32.5% of the respondents from Sample 2 are not sure if they can control the use of their SP for connecting to SNS, while 20% think it is hard for them to control it and 40% think they have control over it (Q17). During the night 45% of the respondents check their SPs for missed posts/comments/likes sometimes, while 22.5% do it always and 32.5 never do it (Q18). Only 23.1% of the respondents feel

rejected if no one likes/comments their post on SNS (Q20), while 5.1% feel low self-esteem, depressed, or anxious when they see their friend received more likes/comments on SNS than they did (Q21). However, 31.7% of the respondents try not to check their SP for SNS activity (Q22_2) but they fail, while 53.7% check their SPs for SNS even when talking and eating with others (Q22_3).

In Sample 2 no one gets angry if someone interrupts them while they use their SPs for SNS (Q22_1). On the other hand, 65.9% of the respondents keep their SPs on 24 h a day (Q23_1), 36.6% think they hear their SP ringing/vibrating even when it is not (Q23_2), for 14.6% others are complaining about them spending too much time on their SPs for SNS (Q23_3), while 12.2% feel uneasy in places where mobile phone usage is prohibited (Q23_4) and 0% feel as if they are with someone when they use their SP for SNS (Q23_5). When their SP has no minutes, battery charge, or is out of range, 17.1% feel anxious (Q24_1), 4.9% feel distressed (Q24_2), 26.8% feel agitated (Q24_3), 2.4% feel afraid (Q24_4), 14.5% feel disoriented (Q24_5), while most of them (61%) feel normal (Q24_6). Lastly, the following percentage of respondents experienced symptoms/emotions related to low quality of mental health when they were unable to use SNS for some reason: 14.6% tachycardia (Q25_1), 9.8% tremors (Q25_2), 2.4% sweating (Q25_3), 4.9% changes in respiration (Q25_4), 7.3% depression (Q25_5), 17.1% loneliness (Q25_6), 7.3% rejection (Q25_7), and 14.6% panic (Q25_8).

H_2 Complete Sample:

Relevant to H_2, the descriptive statistical analysis revealed that 40.2% of the respondents from Complete Sample are not sure if they can control the use of their SP for connecting to SNS,

while 19.6% think it is hard for them to control it and 40.2% think they have control over it (Q17). During the night 45.5% of the respondents check their SPs for missed posts/comments/likes sometimes, while 17.9% always do it and 36.6% never do it (Q18). Only 29.1% of the respondents feel rejected if no one likes/comments their post on SNS (Q20), while 11.7% feel low self-esteem, depressed, or anxious when they see their friend received more likes/comments on SNS than they did (Q21). However, 46.5% of the respondents try not to check their SP for SNS activity (Q22_2) but they fail, while 41.2% check their SPs for SNS even when talking and eating with others (Q22_3). Overall, there are only 7% of the respondents who feel angry if someone interrupts them while they use their SPs for SNS (Q22_1).

Besides, 61.4% of the respondents keep their SPs on 24 h a day (Q23_1), 35.1% think they hear their SP ringing/vibrating even when it is not (Q23_2), others are complaining about them spending too much time on their SPs for SNS for 10.5% (Q23_3), while 14.9% feel uneasy in places where mobile phone usage is prohibited (Q23_4) and 15.8% feel as if they are with someone when they use their SP for SNS (Q23_5). When their SP has no minutes, battery charge, or is out of range, 21.9% feel anxious (Q24_1), 7% feel distressed (Q24_2), 26.8% feel agitated (Q24_3), 4.4% feel afraid (Q24_4), 15.8% feel disoriented (Q24_5), while most of them (49.1%) feel normal (Q24_6). Lastly, the following percentage of respondents experienced symptoms/emotions related to low quality of mental health when they were unable to use SNS for some reason: 6.1% tachycardia (Q25_1), 4.4% tremors (Q25_2), 2.6% sweating (Q25_3), 2.6% changes in respiration (Q25_4), 4.4% depression (Q25_5), 20.2% loneliness (Q25_6), 6.1% rejection (Q25_7), and 14.4% panic (Q25_8).

H_3 Descriptive Statistics

H_3 Sample 1 (RIT):

Regarding H_3, the descriptive statistical analysis implies that in Sample 1, 15.1% of the respondents feel forced to change habits to adapt to developments in SPs and SNS (Q16_1), 56.2% feel as if their lives are being invaded by SPs and SNS technologies (Q16_2), 5.5% feel threatened by people with newer SPs and SNS technology (Q16_3), and 9.6% feel they need to sacrifice their personal time to keep current with new SP and SNS technologies (Q16_4). On the other hand, 12.3% have hard time falling asleep because they wonder what is happening on SNS (Q26_1), 31.5% are often sleep-deprived because they check what is happening on SNS during the night (Q26_2), while 15.3% check their SPs do it always and 45.8% do it sometimes (Q18). Moreover, 58.3% of the respondents think that using SP for SNS takes a lot of their time, which they should rather spend studying or working (Q15). Lastly, 4.1% risked a job, an academic opportunity, or a career opportunity because of overusing their SP for SNS (Q19_1), while 35.6% of them cannot concentrate on class because they have to check their SPs for SNS activity (Q19_2).

H_3 Sample 2 (VERN):

In regards to H_3, the descriptive statistical analysis revealed that in Sample 2, 9.8% of the respondents feel forced to change habits to adapt to developments in SPs and SNS (Q16_1), 46.3% feel as if their lives are being invaded by SPs and SNS technologies (Q16_2), 2.4% feel threatened by people with newer SP and SNS technology (Q16_3), and 17.1% feel they need to sacrifice their personal time to keep current with new SP and SNS technologies (Q16_4). On the other hand, 2.4% have hard time falling asleep because they wonder what is happening on SNS

(Q26_1), 46.3% are often sleep-deprived because they check what is happening on SNS during the night (Q26_2), while 22.5% check their SPs do it always and 45% do it sometimes (Q18). Moreover, 55% of the respondents think that using SP for SNS takes a lot of their time, which they should rather spend studying or working (Q15). Lastly, 9.8% risked a job, an academic opportunity, or a career opportunity because of overusing their SP for SNS (Q19_1), while 41.5% of them cannot concentrate on class because they have to check their SPs for SNS activity (Q19_2).

H_3 Complete Sample:

Relevant to H_3, the descriptive statistical analysis implies that in the Complete Sample, 13.2% of the respondents feel forced to change habits to adapt to developments in SPs and SNS (Q16_1), 52.6% feel as if their lives are being invaded by SPs and SNS technologies (Q16_2), 4.4% feel threatened by people with newer SP and SNS technology (Q16_3), and 12.3% feel they need to sacrifice their personal time to keep current with new SP and SNS technologies (Q16_4). On the other hand, 8.8% have hard time falling asleep because they wonder what is happening on SNS (Q26_1), 36.8% are often sleep-deprived because they check what is happening on SNS during the night (Q26_2), while 17.9% check their SPs do it always and 45.5% do it sometimes (Q18). Moreover, 57.1% of the respondents think that using SP for SNS takes a lot of their time, which they should rather spend studying or working (Q15). Lastly, only 6.1% risked a job, an academic opportunity, or a career opportunity because of overusing their SP for SNS (Q19_1), while even 37.7% of them cannot concentrate on class because they have to check their SPs for SNS activity (Q19_2).

Analysis of Variance – One-Way ANOVA

H_1 One-Way ANOVA Test Results

The frequency results from descriptive statistics suggest that the respondents from each sample individually and from the complete sample prefer real-life social interaction over virtual social interaction. Since, 60.3% of the respondents from Sample 1 (RIT), 68.3% from Sample 2 (VERN), and 63.2% from Complete Sample spend three hours or more in face-to-face contact with others. Also, 73.6% of the respondents from Sample 1 (RIT), 78% from Sample 2 (VERN), and 75.2% from Complete Sample never ended an intimate relationship with someone over SNS. Moreover, 74% of respondents from Sample 1 (RIT), 43.9% from Sample 2 (VERN), and 62.2% from Complete Sample prefer to keep in touch with others by talking in person. Thus, it is only logical that the H_1 should be rejected. However, H_1 proposes that those who spend more time connecting to SNS through SPs are more likely to prefer virtual social interaction over real-life social interaction. Thus, what we would like to see next is if there are certain differences in regards to preferring virtual or real-life social interaction between those who spend little or no time (Group 1), those who spend moderate amount of time (Group 2), and those who spend an excessive amount of time per day connecting to SNS through their SPs (Group 3). For that purpose, a series of one-way ANOVA tests (Table 2, Table 3, and Table 4) against each relevant question between all three groups (1, 2, and 3) were performed, as well as individually between Group 1 and Group 2, Group 2 and Group 3, and Group 1 and Group 3.

Table 2.

H_1 One-Way ANOVA Test Results for Testing Sample 1 (RIT)

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q5 Average amount of leisure/social time per day spent face-to-face	3.13	0.055	4.07	0.187	0.81	0.373	1.22	0.277
Q6 Posts/likes/comments more than 3 times per day	4.58	0.014*	0.41	0.527	6.93	0.011*	5.50	0.025*
Q7 Receives more than 3 likes/comments per day	0.64	0.528	0.10	0.748	1.89	0.174	0.28	0.600
Q8 Prefers virtual friends and relationships over real	7.05	0.007*	0.18	0.678	15.75	0.003*	12.37	0.006*
Q9 Ended an intimate relationship by sending a message on SNS	0.98	0.379	0.41	0.527	1.04	0.311	1.43	0.240
Q10 Prefers real friendships over virtual	16.05	0.000*	31.10	0.001*	2.80	0.133	23.66	0.001*
Q11 SNS Vs. Real Contact to keep in touch with others	2.97	0.058	2.22	0.143	5.43	0.023*	0.02	0.901
Q12 SNS Vs. Real Contact to let others know they are upset	1.66	0.196	2.34	0.134	0.38	0.542	3.58	0.067
Q13 Feel Disconnected or not when without SP	3.14	0.049*	0.29	0.589	4.69	0.034*	3.63	0.066
Q14 Feel out of touch or not if not logged onto my SNS for a day	9.01	0.000*	5.33	0.026*	6.64	0.012*	19.86	0.000*

* $p < 0.05$

Five dependent variables were significantly affected by independent variable. First, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *posting more than three likes/comments per day* at the $p<.05$ level for the three conditions [$F (2, 69) = 4.58$, $p = 0.014$] (Q6). The source of this difference was found between Group 2 and Group 3 [$F (1, 62) = 6.93$, $p = 0.011$] as well as between Group 1 and Group 3 [$F (1, 35) = 5.50$,

p = 0.025]. Second, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *preferring virtual social interaction over real-life social interaction* at the p<.05 level for the three conditions [F (2, 15) = 7.05, p = 0.007] (Q8). The source of this difference was found between Group 2 and Group 3 [F (1, 10) = 15.75, p = 0.003] as well as between Group 1 and Group 3 [F (1, 3) = 12.37, p = 0.006].

Third, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *preferring real-life social interaction over virtual* at the p<.05 level for the three conditions [F (2, 69) = 2.97, p = 0.0004] (Q10). The source of this difference was found between Group 1 and Group 2 [F (1, 8) = 31.10, p = 0.001] as well as between Group 1 and Group 3 [F (1, 8) =23.66, p = 0.001]. Then, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *feeling disconnected from the world/people when without SP* at the p<.05 level for the three conditions [F (2, 68) = 3.14, p = 0.049] (Q13). The source of this difference was found between Group 2 and Group 3 [F (1, 61) = 4.69, p = 0.034]. Finally, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *feeling out of touch if respondent does not log onto SNS for a day* at the p<.05 level for the three conditions [F (2, 68) = 9.01, p = 0.0003] (Q14). The source of this difference was found between Group 1 and Group 2 [F (1, 40) = 5.33 p = 0.026] as well as between Group 2 and Group 3[F (1, 61) = 6.64, p = 0.012] and between Group 1 and Group 3 [F (1, 35) =19.86, p = 0.00008].

Table 3.

H_1 One-Way ANOVA Test Results for Testing Sample 2 (VERN)

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q5 Average amount of leisure/social time per day spent face-to-face	1.12	0.337	0.68	0.416	1.34	0.255	1.01	0.327
Q6 Posts/likes/comments more than 3 times per day	2.24	0.120	0.69	0.416	2.95	0.094	2.22	0.152
Q7 Receives more than 3 likes/comments per day	2.83	0.116	4.68	0.044	0.02	0.884	4.24	0.053
Q8 Prefers virtual friends and relationships over real	2.36	0.129	0.91	0.363	0.89	0.368	12.66	0.005*
Q9 Ended an intimate relationship by sending a message on SNS	3.96	0.028*	0.11	0.749	7.04	0.012*	1.21	0.284
Q10 Prefers real friendships over virtual	19.04	0.000*	47.35	0.000*	1.72	0.226	19.03	0.002*
Q11 SNS Vs. Real Contact to keep in touch with others	1.65	0.207	0.23	0.641	3.18	0.083	0.10	0.755
Q12 SNS Vs. Real Contact to let others know they are upset	0.28	0.755	0.25	0.622	0.47	0.499	0.04	0.847
Q13 Feel Disconnected or not when without SP	1.32	0.279	0	1	2.58	0.117	0.53	0.473
Q14 Feel out of touch or not if not logged onto my SNS for a day	1.99	0.150	0,9	0.355	2.26	0.141	2.49	0.131

* $p < 0.05$

Two dependent variables were significantly affected by independent variable. There was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *ending an intimate relationship with someone by sending a message on SNS* at the $p<.05$ level for the three conditions [$F (2, 37) = 3.96$, $p = 0.028$] (Q9). This difference was found between Group 2 and Group 3 [$F (1, 36) = 7.04$, $p = 0.012$]. In addition, there was a significant effect of

amount of time the students spent on connecting to SNS through their SPs on *preferring real-life social interaction over virtual* at the p<.05 level for the three conditions [F (2, 12) = 19.04, p = 0.0001] (Q10). The source of this difference was found between Group 1 and Group 2 [F (1, 8) = 47.35, p = 0.0001] as well as between Group 1 and Group 3 [F (1, 8) = 19.03, p = 0.002].

Table 4.

H_1 One-Way ANOVA Test Results for Testing Complete Sample

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q5 Average amount of leisure/social time per day spent face-to-face	1.55	0.218	2.51	0.118	2.06	0.155	0.28	0.599
Q6 Posts/likes/comments more than 3 times per day	6.36	0.002*	0.74	0.392	9.39	0.003*	6.82	0.011*
Q7 Receives more than 3 likes/comments per day	1.52	0.224	0.79	0.379	1.42	0.235	2.47	0.121
Q8 Prefers virtual friends and relationships over real	8.94	0.003*	13.06	0.005*	0.64	0.442	20.57	0.001*
Q9 Ended an intimate relationship by sending a message on SNS	3.42	0.036*	0.29	0.587	5.27	0.024*	2.75	0.103
Q10 Prefers real friendships over virtual	36.38	0.000*	67.18	0.000*	4.03	0.079	66.74	0.000*
Q11 SNS Vs. Real Contact to keep in touch with others	4.12	0.019*	3.05	0.086	7.34	0.008*	0.01	0.935
Q12 SNS Vs. Real Contact to let others know they are upset	1.65	0.197	1.46	0.232	1.01	0.317	2.92	0.093
Q13 Feel Disconnected or not when without SP	4.97	0.009*	0.37	0.545	7.79	0.006*	5.13	0.027

Q14 Feel out of touch or not if not logged onto my SNS for a day	10.35	0.000*	6.05	0.017*	8.47	0.004*	19.31	0.000

* $p < 0.05$

Seven dependent variables were significantly affected by independent variable. There was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *posting more than three likes/comments per day* at the p<.05 level for the three conditions [F (2, 109) = 6.36, p = 0.002] (Q6). The source of this difference was found between Group 2 and Group 3 [F (1, 100) = 9.39, p = 0.003] as well as between Group 1 and Group 3 [F (1, 57) = 6.82, p = 0.011]. Further, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *preferring virtual social interaction over real-life social interaction* at the p<.05 level for the three conditions [F (2, 15) = 8.94, p = 0.003] (Q8). This difference was confirmed between Group 1 and Group 2 [F (1, 10) = 13.06, p = 0.005] as well as between Group 1 and Group 3 [F (1, 10) = 20.57, p = 0.001]. Furthermore, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *ending an intimate relationship with someone by sending a message on SNS* at the p<.05 level for the three conditions [F (2, 109) = 3.42, p = 0.036] (Q9). This difference was found between Group 2 and Group 3 [F (1, 100) = 5.27, p = 0.024].

In addition, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *preferring real-life social interaction over virtual* at the p<.05 level for the three conditions [F (2, 12) = 36.38, p = 0.000008] (Q10). This difference was confirmed between Group 1 and Group 2 [F (1, 8) = 67.18, p = 0.00004] as well as between Group 1 and Group 3 [F (1, 8) = 66.74, p = 0.00004]. Moreover, there was a significant effect of

amount of time the students spent on connecting to SNS through their SPs on *preferring SNS or real-life contact to keep in touch with others* at the p<.05 level for the three conditions [F (2, 108) = 4.12, p = 0.019] (Q11). This difference was found between Group 2 and Group 3 [F (1, 99) = 7.34, p = 0.008]. Then, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *feeling disconnected from the world/people when without SP* at the p<.05 level for the three conditions [F (2, 108) = 4.97, p = 0.009] (Q13). This difference was confirmed between Group 2 and Group 3 [F (1, 99) = 7.79, p = 0.006] as well as between Group 1 and Group 3 [F (1, 57) = 5.13, p = 0.027]. Finally, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *feeling out of touch if respondent does not log onto SNS for a day* at the p<.05 level for the three conditions [F (2, 107) = 10.35, p = 0.0003] (Q14). This difference was found between Group 1 and Group 2 [F (1, 60) = 6.05, p = 0.017] as well as between Group 2 and Group 3 [F (1, 98) = 8.47, p = 0.004] and between Group 1 and Group 3 [F (1, 56) = 19.31, p = 0.00005].

H_2 One-Way ANOVA Test Results

The frequency results from descriptive statistics suggest that the respondents from each sample individually and from the complete sample do not suffer from symptoms of mental disorders. Since, only 32.4% of the respondents from Sample 1 (RIT), 23.1% from Sample 2 (VERN), and 29.1% from Complete Sample feel rejected if no one likes/comments their post on SNS. Also, only 24.7% of the respondents from Sample 1 (RIT), 17.1% from Sample 2 (VERN), and 21.9% from Complete Sample feel anxious when their SP has no minutes, battery charge, or is out of range. Moreover, 21.9% of respondents from Sample 1 (RIT), 17.1% from Sample 2 (VERN), and 20.2% from Complete Sample experienced loneliness as a symptom/emotion

related to low quality of mental health when they were unable to use SNS for some reason. Thus, it is only logical that the H_2 should be rejected. However, what we would like to see next is if there are certain differences in regards to suffering from symptoms of mental disorders between Group 1, Group 2, and Group 3 regarding the amount of time per day connecting to SNS through their SPs. For that purpose, a series of one-way ANOVA tests (Table 5, Table 6, and Table 7) against each relevant question using the same logic as for H_1 testing.

Table 5.

H_2 One-Way ANOVA Test Results for Testing Sample 1 (RIT)

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q17 Find it hard to control the use of SP for connecting to SNS	8.99	0.000*	3.31	0.076*	10.37	0.002*	11.01	0.002*
Q18 Check for missed calls/messages/posts/comments/likes during the night	0.52	0.596	0.10	0.752	0.65	0.420	0.80	0.375
Q20 Feels rejected when no one likes/comments their post/photo/status on SNS	0.89	0.415	0.01	0.934	1.55	0.217	0.69	0.412
Q21 Feel low self-esteem, depressed, or anxious when friend receives more likes/comments	3.17	0.048*	0.72	0.403	4.16	0.046*	2.89	0.098
Q22 Cannot control the use of SPs for connecting to SNS, feels anger if interrupted	2.96	0.127	4.05	0.114	0.03	0.869	8.89	0.041*
Q23 Personification of SPs and SNS, compulsive behavior	2.78	0.102	4.156	0.076	0.03*	0.860	8.60	0.019*

Q24 (24_1 to 24_5) Show symptoms of mental disorders when unable to use SP	7.22	0.009*	8.33	0.020*	1.047	0.336	17.82	0.003*
Q24_6 Experience no symptoms (a.k.a. feel "normal") when unable to use SP	2.22	0.119	0.08	0.783	4.10	0.049*	1.57	0.218
Q25 Experience emotions connected to low quality of mental health	2.70	0.090	1,6	0.226	1.298	0.274	5.38	0.035*

* $p < 0.05$

There were three dependent variables significantly affected by independent variable. First, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *controlling the use of SP for connecting to SNS* at the p<.05 level for the three conditions [F (2, 69) = 8.99, p = 0.0003] (Q17). The source of this difference was found between Group 2 and Group 3 [F (1, 62) = 10.37 p = 0.002] as well as between Group 1 and Group 3 [F (1, 35) = 11.01, p = 0.002]. Then, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *feeling low self-esteem, depressed, or anxious when respondent' friend receives more likes/comments* at the p<.05 level for the three conditions [F (2, 62) = 3.17, p = 0.048] (Q21). The source of this difference was found between Group 2 and Group 3 [F (1, 62) = 4.16, p = 0.046]. Finally, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *experiencing symptoms of mental disorders when respondent's SP is somehow disabled* at the p<.05 level for the three conditions [F (2, 12) = 7.22, p = 0.009] ((Q24_1 to Q24_5). The source of this difference was found between Group 1 and Group 2 [F (1, 8) = 8.33, p = 0.020] as well as between Group 1 and Group 3 [F (1, 8) =17.82, p = 0.003].

Table 6.

H_2 One-Way ANOVA Test Results for Testing Sample 2 (VERN)

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q17 Find it hard to control the use of SP for connecting to SNS	0.89	0.420	1.61	0.222	0.06	0.802	1.75	0.201
Q18 Check for missed calls/messages/posts/comments/likes during the night	3.26	0.049*	0.10	0.752	5.76	0.022*	1.52	0.231
Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q20 Feels rejected when no one likes/comments their post/photo/status on SNS	0.28	0.758	0.55	0.468	0.03	0.863	0.48	0.49
Q21 Feel low self-esteem, depressed, or anxious when friend receives more likes/comments	1.29	0.288	0.24	0.631	2.39	0.131	N/A	N/A
Q22 Cannot control the use of SPs for connecting to SNS, feels anger if interrupted	1.35	0.328	1.92	0.238	0.36	0.581	2.45	0.192
Q23 Personification of SPs and SNS, compulsive behavior	1.03	0.388	1.35	0.278	0.19	0.674	2.05	0.189
Q24 (24_1 to 24_5) Show symptoms of mental disorders when unable to use SP	3.88	0.050*	2.38	0.161	2.50	0.152	5.78	0.043*
Q24_6 Experience no symptoms (a.k.a. feel "normal") when unable to use SP	0.99	0.380	0.38	0.541	1.96	0.171	0	1

Q25 Experience emotions connected to low quality of mental health	14.23	0.000*	2,8	0.116	12.06	0.004*	18.66	0.001*

* $p < 0.05$

Three dependent variables were significantly affected by independent variable. First, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *checking their SPs for missed posts/comments/likes during the night* at the p<.05 level for the three conditions [F (2, 36) = 3.26, p = 0.049] (Q18). The source of this difference was found between Group 2 and Group 3 [F (1, 35) = 5.76 p = 0.022]. Then, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *experiencing symptoms of mental disorders when respondent's SP is somehow disabled* at the p<.05 level for the three conditions [F (2, 12) = 3.88, p = 0.050] (Q24_1 to Q24_5). The source of this difference was found between Group 1 and Group 3 [F (1, 8) = 5.78, p = 0.043]. Lastly, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *experiencing emotions connected to low quality of mental health when respondent was somehow prevented from using SNS for some period* at the p<.05 level for the three conditions [F (2, 21) = 14.23, p = 0.0001] (Q25). The source of this difference was found between Group 2 and Group 3 [F (1, 14) = 12.06, p = 0.004] as well as between Group 2 and Group 3 [F (1, 98) = 8.47, p = 0.004] and between Group 1 and Group 3 [F (1, 14) =18.66, p = 0.001].

Table 7.

H_2 One-Way ANOVA Test Results for Testing Complete Sample

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q17 Find it hard to control the use of SP for connecting to SNS	6.05	0.003*	4.94	0.029*	4.45	0.037*	9.59	0.003*
Q18 Check for missed calls/messages/posts/comments/likes during the night	3.47	0.034*	0.67	0.415	4.62	0.034*	4.14	0.046*
Q20 Feels rejected when no one likes/comments their post/photo/status on SNS	0.56	0.575	0.13	0.718	0.72	0.397	0.67	0.416
Q21 Feel low self-esteem, depressed, or anxious when friend receives more likes/comments	1.33	0.269	1.03	0.314	1.09	0.299	1.93	0.170
Q22 Cannot control the use of SPs for connecting to SNS, feels anger if interrupted	3.07	0.121	4.46	0.102	0.18	0.696	7.45	0.052*
Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q23 Personification of SPs and SNS, compulsive behavior	2.86	0.097	4.46	0.067	0.01	0.936	7.39	0.026*
Q24 (24_1 to 24_5) Show symptoms of mental disorders when unable to use SP	2.24	0.068	3.43	0.094	0.07	0.801	16.57	0.002*
Q24_6 Experience no symptoms (a.k.a. feel "normal") when unable to use SP	3.26	0.042*	0.36	0.548	6.38	0.013*	0.68	0.414

Q25 Experience emotions connected to low quality of mental health	8.22	0.002*	4.57	0.051*	5.09	0.041*	13.08	0.003*

* $p < 0.05$

There were four dependent variables that were significantly affected by independent variable. First, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *controlling the use of SP for connecting to SNS* at the p<.05 level for the three conditions [F (2, 108) = 6.05 p = 0.003] (Q17). The source of this difference was found between Group 1 and Group 2 [F (1, 60) = 4.94 p = 0.029] as well as between Group 2 and Group 3 [F (1, 99) = 4.45, p = 0.037] and between Group 1 and Group 3 [F (1, 57) = 9.59, p = 0.003]. Next, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *checking their SPs for missed posts/comments/likes during the night* at the p<.05 level for the three conditions [F (2, 108) = 3.47, p = 0.034] (Q18). The source of this difference was found between Group 2 and Group 3 [F (1, 99) = 4.62 p = 0.034] as well as between Group 1 and Group 3 [F (1, 57) =4.14, p = 0.046].

Then, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *experiencing no symptoms of mental disorders (a.k.a. feeling normal) when respondent's SP is somehow disabled* at the p<.05 level for the three conditions [F (2, 108) = 3.26, p = 0.042] (Q24_6). The source of this difference was found between Group 2 and Group 3 [F (1, 101) = 6.38, p = 0.013]. Finally, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *experiencing emotions connected to low quality of mental health when respondent was somehow prevented from using SNS for some period* at the p<.05 level for the three conditions [F (2, 21) = 8.22, p = 0.002] (Q25). The source

of this difference was found between Group 1 and Group 2 [F (1, 14) = 4.57, p = 0.051] as well as between Group 2 and Group 3 [F (1, 14) = 5.09, p = 0.041] and between Group 1 and Group 3 [F (1, 14) = 13.08, p = 0.003].

H_3 One-Way ANOVA Test Results

The frequency results from descriptive statistics suggest that the respondents from each sample individually and from the complete sample do not suffer from high levels of technostress. Since, only 15.1% of the respondents from Sample 1 (RIT), 9.8% from Sample 2 (VERN), and 13.2% from Complete feel forced to change habits to adapt to developments in SPs and SNS. Also, 5.5% of the respondents from Sample 1 (RIT), 2.4% from Sample 2 (VERN), and 4.4% from Complete Sample feel threatened by people with newer SPs and SNS technology. Moreover, only 9.6% of respondents from Sample 1 (RIT), 17.1% from Sample 2 (VERN), and 12.3% from Complete Sample feel they need to sacrifice their personal time to keep current with new SP and SNS technologies. However, in the complete sample the results imply that sleep deprivation from the overuse of SP for SNS during the night is high at 36.8%. In addition, more than 50% of the respondents in the complete sample show signs of loss of productivity. These results all point into direction that H3 should be rejected or just partially supported. However, what we would like to see next is if there are certain differences in regards to suffering from high levels of technostress, sleep deprivation, and loss of productivity between those who spend little or no time (Group 1), those who spend moderate amount of time (Group 2), and those who spend an excessive amount of time per day connecting to SNS through their SPs (Group 3). For that purpose, a series of one-way ANOVA tests (Table 8, Table 9, and Table 10) against each

relevant question between all three groups (1, 2, and 3) were performed, as well as individually between Group 1 and Group 2, Group 2 and Group 3, and Group 1 and Group 3.

Table 8.

H_3 One-Way ANOVA Test Results for Testing Sample 1 (RIT)

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q15 Use SP for SNS too much, instead of studying or working	4.49	0.015*	6.49	0.015*	0.54	0.46	9.88	0.003*
Q19 Suffer from symptoms of loss of productivity	0.84	0.512	0.58	0.527	0.36	0.609	1.73	0.319
Q16 Suffer from symptoms of Technostress	1.19	0.347	2.29	0.180	0.02	0.902	2.43	0.170
Q18 Sleep Deprivation due to checking SPs during night	0.52	0.599	0.10	0.752	0.66	0.420	0.80	0.376
Q26 Suffer from symptoms of sleep deprivation due to overuse of SPs for connecting to SNS during the night	2.52	0.228	4.57	0.166	0.11	0.776	5.12	0.152

* $p < 0.05$

There was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *using their SPs for SNS too much instead of studying or working* at the $p<.05$ level for the three conditions [$F (2, 69) = 4.49$, $p = 0.015$] (Q15). The source of this difference was found between Group 1 and Group 2 [$F (1, 41) = 6.49$, $p = 0.015$] as well as between Group 1 and Group 3 [$F (1, 35) = 9.88$, $p = 0.003$].

Table 9.

H_3 One-Way ANOVA Test Results for Testing Sample 2 (VERN)

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q15 Use SP for SNS too much, instead of studying or working	2.41	0.105	1.44	0.246	2.18	0.149	3.92	0.062
Q19 Suffer from symptoms of loss of productivity	1.47	0.358	0,4	0.592	0.89	0.445	3,6	0.198
Q16 Suffer from symptoms of Technostress	1.01	0.401	1.94	0.213	0	1	1.94	0.213
Q18 Sleep Deprivation due to checking SPs during night	3.26	0.049*	0.103	0.752	5.76	0.022*	1.52	0.231
Q26 Suffer from symptoms of sleep deprivation due to overuse of SPs for connecting to SNS during the night	0.71	0.558	0.68	0.497	0.36	0.611	1.17	0.393

* $p < 0.05$

There was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *checking their SPs for missed posts/comments/likes during the night* at the $p<.05$ level for the three conditions [$F (2, 36) = 3.26$, $p = 0.049$] (Q18). The source of this difference was found between Group 2 and Group 3 [$F (1, 35) = 5.76$, $p = 0.022$].

Table 10.

H_3 One-Way ANOVA Test Results for Testing Complete Sample

Groups	All Groups		Group1 Vs. Group2		Group2 Vs. Group3		Group1 Vs. Group3	
Construct/Variable	F	p	F	p	F	p	F	p
Q15 Use SP for SNS too much, instead of studying or working	6.43	0.002*	7.31	0.009*	2.09	0.151	14.27	0.000*
Q19 Suffer from symptoms of loss of productivity	1.23	0.408	0.74	0.481	0.526	0.544	2.74	0.239
Q16 Suffer from symptoms of Technostress	1.44	0.286	2.81	0.145	0.01	0.932	2.93	0.138
Q18 Sleep Deprivation due to checking SPs during night	3.48	0.034*	0.67	0.415	4.63	0.034*	4.15	0.046*
Q26 Suffer from symptoms of sleep deprivation due to overuse of SPs for connecting to SNS during the night	7.28	0.009*	7.18	0.028*	2.16	0.180	15.29	0.004*

* $p < 0.05$

Three dependent variables were significantly affected by independent variable. First, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *using their SPs for SNS too much instead of studying or working* at the $p<.05$ level for the three conditions [$F (2, 108) = 6.43$, $p = 0.002$] (Q15). The source of this difference was found between Group 1 and Group 2 [$F (1, 61) = 7.31$ $p = 0.009$] as well as between Group 1 and Group 3 [$F (1, 56) = 14.27$, $p = 0.0004$]. Then, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *checking their SPs for missed posts/comments/likes during the night* at the $p<.05$ level for the three conditions [$F (2, 108) =$

3.48, p = 0.034] (Q18). The source of this difference was found between Group 2 and Group 3 [F (1, 99) = 4.63 p = 0.034] as well as between Group 1 and Group 3 [F (1, 57) = 4.15, p = 0.046]. Finally, there was a significant effect of *amount of time the students spent on connecting to SNS through their SPs* on *suffering from symptoms of sleep deprivation due to the overuse of SPs for connecting to SNS during the night* at the $p<.05$ level for the three conditions [F (2, 12) = 7.28, p = 0.009] (Q26). The source of this difference was found between Group 1 and Group 2 [F (1, 8) = 7.18, p = 0.028] as well as between Group 1 and Group 3 [F (1, 8) = 15.29, p = 0.004].

Overall, there are three different aspects (high levels of technostress, sleep deprivation, and loss of productivity) tested in H_3, hence is worth mentioning that there is a fully significant effect of independent variable on sleep deprivation [F (2, 12) = 7.28, p = 0.009] (Q26) and partially significant effect on loss of productivity [F (2, 108) = 6.43, p = 0.002] (Q15).

Hypotheses Testing

This study investigated the effect of time spent using SNS through SPs on the quality of mental health of RIT Croatia and VERN undergraduate students through proposing three hypotheses:

H_1: Students who spend more time using their SPs for connecting to SNS prefer social interaction over real-life social interaction more often than those who spend minimal time on same activities.

H_2: Students who spend more time using their SPs for connecting to SNS suffer from symptoms of low quality of mental health more often than those who spend minimal time on same activities.

H_3: Students who spend more time using their SPs for connecting to SNS suffer from high levels

technostress, sleep deprivation and loss of productivity more often than those who spend minimal time on same activities.

H_1 One-Way ANOVA Test Results Interpretation

In the complete sample (pp. 53-55 of this document), seven out of ten dependent sub-variables were significantly affected by the independent variable (*amount of time the students spent on connecting to SNS through their SPs*). At the $p<.05$ level, there was a significant effect of independent variable on *connecting to SNS through their SPs* on *posting more than three likes/comments per day* for the three conditions [$F (2, 109) = 6.36$, $p = 0.002$] (Q6), *preferring virtual social interaction over real-life social interaction* for the three conditions [$F (2, 15) = 8.94$, $p = 0.003$] (Q8), *ending an intimate relationship with someone by sending a message on SNS* for the three conditions [$F (2, 109) = 3.42$, $p = 0.036$] (Q9), *preferring real-life social interaction over virtual* for the three conditions [$F (2, 12) = 36.38$, $p = 0.000008$] (Q10), *on preferring SNS or real-life contact to keep in touch with others* for the three conditions [$F (2, 108) = 4.12$, $p = 0.019$] (Q11), *feeling disconnected from the world/people when without SP* at the $p<.05$ level for the three conditions [$F (2, 108) = 4.97$, $p = 0.009$] (Q13), and on *feeling out of touch if respondent does not log onto SNS for a day* for the three conditions [$F (2, 107) = 10.35$, $p = 0.0003$] (Q14).

Thus, the H_1 is not fully, but partially supported. What is interesting is the fact that most of the differences came between Group 1 and Group 3 as well as between Group 2 and Group 3. This suggests that those who spend three hours or more on connecting to SNS through their SPs tend to prefer virtual social interaction over real-life interaction more. This trend was as well

noted through the individual descriptive statistical analysis of each group as well regarding the frequencies of answers from Group 3 that confirmed preferring virtual over real-life social interaction.

H_2 One-Way ANOVA Test Results Interpretation

In the complete sample (pp. 59-61 of this document), four out of nine dependent sub-variables were significantly affected by the independent variable (*amount of time the students spent on connecting to SNS through their SPs*). At the $p<.05$ level, there was a fully effect of independent variable on *controlling the use of SP for connecting to SNS* for the three conditions [$F (2, 108) = 6.05$ $p = 0.003$] (Q17), *checking their SPs for missed posts/comments/likes during the night* for the three conditions [$F (2, 108) = 3.47$, $p = 0.034$] (Q18), *experiencing no symptoms of mental disorders (a.k.a. feeling normal) when respondent's SP is somehow disabled* for the three conditions [$F (2, 108) = 3.26$, $p = 0.042$] (Q24_6), and on *experiencing emotions connected to low quality of mental health when respondent was somehow prevented from using SNS for some period* for the three conditions [$F (2, 21) = 8.22$, $p = 0.002$] (Q25).

Thus, the H_2 is not supported. However, it is interesting that most of the differences came from between Group 2 and Group 3. This suggests that those who spend three hours or more on connecting to SNS through their SPs are more inclined to suffer from symptoms of mental disorders. This trend was as well noted through the individual descriptive statistical analysis of each group regarding the frequencies of answers from Group 3. In this analysis, it was revealed that only respondents from Group 3 answered to the questions related to suffering from mental disorders. This suggests that another study should be done on respondents who spend three hours

or more on connecting to SNS through their SPs to see if they suffer from symptoms of mental disorders as a result.

H_3 One-Way ANOVA Test Results Interpretation

In the complete sample (pp. 64-65 of this document), three out of five dependent sub-variables were significantly affected by the independent variable (*amount of time the students spent on connecting to SNS through their SPs*). However, since there are three different aspects (high levels of technostress, sleep deprivation, and loss of productivity) tested in H_3, it is worth mentioning that there is a fully significant effect of independent variable on sleep deprivation [$F(2, 12) = 7.28$, $p = 0.009$] (Q26) and partially significant effect on loss of productivity [$F(2, 108) = 6.43$, $p = 0.002$] (Q15).

Thus, although H_3 is not fully supported, it is partially supported. However, it is interesting that most of the differences came from between Group 1 and Group 3. This suggests that those who spend half an hour or less on connecting to SNS through their SPs do not suffer from technostress, sleep deprivation, and/or loss of productivity. This trend was as well noted through the individual descriptive statistical analysis of each group regarding the frequencies of answers from Group 1. In this analysis, it was revealed that only respondents from Group 1 did not even bother to answer (the multi response questions were "choose what is true for you" type, so the respondents could or could not answer to those questions) to the questions related to suffering from technostress, sleep deprivation, and loss of productivity.

CHAPTER V.

Introduction to the Conclusions, Implications, and Limitations and Recommendations

The objective of this research study was to see if the current trend of excessive usage of smartphones (SPs) for connecting to social networking sites (SNS) has any impact on the quality of mental health in young adults (in this case RIT Croatia and VERN students). Accordingly, an extensive literature review (pp.10-26), descriptive statistics (pp. 40-49), and a series of one-way ANOVA tests (pp. 49-68) were done to test the three proposed hypotheses:

H_1: Students who spend more time using their SPs for connecting to SNS prefer social interaction over real-life social interaction more often than those who spend minimal time on same activities.

H_2: Students who spend more time using their SPs for connecting to SNS suffer from symptoms of low quality of mental health more often than those who spend minimal time on same activities.

H_3: Students who spend more time using their SPs for connecting to SNS suffer from high levels technostress, sleep deprivation and loss of productivity more often than those who spend minimal time on same activities.

The conclusions, implications, and limitations and recommendations will be explained in detail in the following three subsections.

Conclusions

Amid the ever-advancing new technologies in SPs and SNS technology, the question is not if we use them or not, but rather how much they already penetrated our everyday lives and

social interaction, and to what extent do we already depend on them. On the other side, little is known about the long-term effect of this newborn symbiosis on the quality of our mental health. And what better way is there to test these effects than on the population of young adults who seem to have almost an intuitive relationship with SPs and SNS? Based on an extensive literature review, the author conducted a survey among two Croatian universities, targeting the population between 18 and 22 years of age, with an objective to see how the time they spend on using SPs for connecting to SNS (independent variable) affects the quality of their mental health in regards to the following three dependent variables: 1. social interaction, 2. mental health, and 3. levels of technology induced stress (technostress), sleep deprivation, and loss of productivity.

Accordingly, the one-way ANOVA test results from this research study partially supported that students who spend more time using their SPs for connecting to SNS prefer social interaction over real-life social interaction more often than those who spend minimal time on same activities (*H_1: Students who spend more time using their SPs for connecting to SNS prefer social interaction over real-life social interaction more often than those who spend minimal time on same activities*) and revealed that most of the students (Group 3) who use their SPs to connect to SNS excessively (three or more hours per day), prefer virtual social interaction rather than real-life social interaction. However, the one-way ANOVA test results also rejected H_2 *(Students who spend more time using their SPs for connecting to SNS suffer from symptoms of low quality of mental health more often than those who spend minimal time on same activities).* In other words, this research suggests that the students who spend more time using their SPs for connecting to SNS do not suffer from symptoms of low quality of mental health more often than those who spend minimal time on same activities and reveals that the time spent on connecting to

SNS through SPs does not induce neither symptoms nor emotions related to mental disorders and low quality of mental health in students who participated in the study. On the other side, in regards to H_3 (*Students who spend more time using their SPs for connecting to SNS suffer from high levels technostress, sleep deprivation, and loss of productivity more often than those who spend minimal time on same activities*), the results imply that although there was no significant effect of time spent on connecting to SNS through SPs on levels of technostress, still there was partially significant effect on loss of productivity, and significant effect on sleep deprivation. Therefore, the H_3 was partially supported.

Implications

The results are always scientific in nature and tend to sound more theoretical and less applicable. Thus, what are some real-life lessons that can be learned from these findings? To begin with, the very finding that only 10 out of 113 respondents (9%) use their SPs for SNS for less than half an hour per day, suggests that SPs and SNS became a part of everyday life for most of the students (Drussel, 2012; King et al., 2014; Sarwar & Soomro, 2013). These results are in accordance with what Drussell's study already revealed - that for today's students it is more normal to use SP for SNS for more than half an hour per day than it is to use it less (Drussell, 2012). Yet, it is interesting that for intimate or personal matters, such as keeping in touch with others by talking in person, the majority of tested students (79.8% of respondents prefer to keep in touch with others by talking in person, while only 5.4% use SNS for that purpose) still prefer face-to-face social interaction, regardless of the time they spend using SP for SNS, which is in line with Drussell's finding that the majority of the participants (68%, n=15) spend over two

hours in face-to face social/leisure time, while only 9% (n=2) spend an hour or less (Drussell, 2012, p. 24).

The further results of this research study (51.8% of the respondents feel emotionally and/or physically disconnected from the world/people if they have no SP and 46.8% feel out of touch if have not logged onto their SNS for a day) are in accordance with those of Babdi-Akashe et al., who found that the close relationship between SPs and SNS contributes even more to young people building a strong emotional bond to their SPs, most probably because SPs enable them to communicate in real-time with not only their close friends, but also anyone anywhere in the world (Babdi-Akashe et al., 2014). This only adds more evidence to the emerging issue that virtual reality is becoming more like reality itself and as such is an interesting subject for research (Runions, 2013, p. 757). Moreover, these results (51.8% of the respondents feel emotionally and/or physically disconnected from the world/people if they have no SP (Q13) and 46.8% feel out of touch if have not logged onto their SNS for a day (Q14)), are in line with King et al. (2014) study, which revealed that the very addictive nature of SPs and SNS has a potential to modify our perception of reality and feelings of space and time and provide an escape from reality for many of us (p. 34). Accordingly, we can say that by examining the impact of time young adults spend using their SPs for connecting to SNS on the several aspects of mental quality, this research study approached very emerging and real problems.

On the other side, the occurrences of symptoms of mental disorders and the related emotions in tested subjects are still rare. Hence, this research revealed the high percentage (40.2%) of tested subjects who think they hold control over their use of SPs for SNS and the response rate on the questions related to symptoms/emotions indicating low quality of mental

health was rather low (ranging from 2.6% to 26.8% of positive answers Vs. 49.1% who felt no such symptoms). Although Cheever, et al. (2014) discovered that the participants in their study, when prohibited to use their mobile phones for instant access to the world of social interaction, have shown withdrawal symptoms such as pronounced anxiety or depression, the results of this study suggest that there is no such connection. Further, while Lin et al. (2015) discovered a positive relationship between the excessive use of mobile technology and the inability to control urges, anxiety, withdrawal symptoms, and productivity loss, this research with a rather low response rate on the questions indicating low quality of mental health (ranging from 2.6% to 26.8% of positive answers Vs. 49.1% who felt no symptoms), lacks such evidences.

On the other hand, since only 13.2% of the respondents feel forced to change habits to adapt to developments in SPs and SNS, 12.3% feel they need to sacrifice their personal time to keep current with new SPs and SNS technologies, and 4.4% feel threatened by people with newer SP and SNS technology, this research indicates that technostress still seems to be either overall neglected or even non-existent, at least among tested subjects. These results are conflicting with what Lee et al. found in their research, which is a close link between the compulsive behavior that SPs induce and the level of technology induced stress (technostress), as well as with Jenna's research which indicated that SPs' overdependence and compulsive usage can induce the level of stress in users, which could result in psychological distress in students (Jena, 2015, p. 360; Lee et al., 2014, pp. 374-376). Yet, the fully significant effect of independent variable (time spent using SPs for connecting to SNS) on sleep deprivation [$F(2, 12) = 7.28$, $p = 0.009$] (Q26) and partially significant effect on loss of productivity [$F(2, 108) =$

6.43, p = 0.002] (Q15) seem to support the results of Shapiro and Margolin (2014), as well as those Adams et al. (2013) and Babdi-Akashe et al. (2014).

Here it is important to mention that since 36.8% of the respondents in this study answered they are often sleep-deprived because they have to check what is happening on SNS during the night (Q26_2), the results of this study are in accordance with the study done by Przybylski et al. (2013), which revealed that "fear of missing out" (FoMO) is responsible for young adults' stickiness to SNS. Moreover, since 57.1% of the respondents think that using SPs for SNS takes a lot of their time, which they should rather spend studying or working (Q15) and even 37.7% of them cannot concentrate on class because they have to check their SPs for SNS activity (Q19_2), the results of this research add evidence to Lin et al. (2015), who revealed that excessive use of mobile technology results in productivity loss and Shapiro and Margolin (2014), who discovered that SNS have a great impact not only on sleep quality, sleep deprivation, and the resulting daytime dreaming, but on academic performance as well. Finally, since 17.9% of the respondents check their SPs for SNS activity always and 45.5% do it sometimes (Q18), this research is supporting Adams and Kisler's (2013) study, which revealed that Facebook was the most prominent exogenous factor with the greatest impact on circadian rhythm of college students (p. 27).

To clarify, the findings from this research study can be beneficial on several accounts. First, they could help the students to understand the extent of their dependence on SPs and SNS and, as Shapiro and Margolin (2014) suggested, help them figure out how to stay on the safe side and not delve too deep and become addicted, but rather control their impulses (p. 13). In that way, they could keep their real-life friendships/relationships healthy and sleep enough to not

suffer from sleep deprivation or loss of productivity (academically or otherwise). Next, the professors could benefit from the findings of this study to understand the very nature of the relationship their students have with their SPs and SNS so that they can take it as an advantage and use it for making their classes more interactive using the very devices and platforms their students have already fully adopted. Then, these findings could be of great interest for researchers in many research fields (almost impossible to address them all, but psychology, sociology, information science, education, business/entrepreneurship, medicine and technological sciences for sure) to further explore and use them either to gain more knowledge and prosper from it intellectually, or to make use of them in terms of helping people or even gaining profit. Lastly, we can all benefit from these findings by noticing warning (addictive or stress provoking) patterns in our own behavior and take care to not undermine the importance of real-life social interaction.

After all, we are still human beings with five senses: sight, hearing, touch, smell, and taste (Cheock, 2014). And although, the first two of them can currently be almost completely substituted with virtual social interaction, can we really touch or smell the person who we interact with virtually? Or is it just a matter of time when we will be able to do so as real as we can in real-life social interaction (Cheock, 2014)? However, as things stand today, your friend can share a photo of her coffee and tag you (X): - "X you would love this coffee! It tastes exactly as the one you always make for me at your home." – Yet, can you confirm that she is right? Probably, not. At least until you do not physically come there and try it yourself.

The world is changing and, as the results of this research study suggest, most of us adapt to these changes quite quickly. However, never has the technology penetrated people's lives as

deeply and thoroughly as it has now. Thus, this study has only addressed an almost invisibly small portion of something that is worth of investigating more thoroughly in the future. Technology is a human invention, but how far it can go and how will these technological advancements, our own product, affect the quality of our mental health still needs to be researched further.

Limitations and Recommendations

First limitation of the study is the use of self-reporting of the respondents. As such, the study lacks professional evaluation and opinion, which makes the results less reliable. Second limitation is that the study is cross-sectional. A longitudinal study would provide a more detailed and in-depth analysis of the research problem. Further, an important limitation of the study is that the sample is convenient. A sample that would comprise of all Croatian undergraduate students between the age of 18 and 22 would be more appropriate. Furthermore, the sample is not stratified, thus the factors such as social status, ethnicity, or gender have been overlooked. Lastly, although Croatian students are a good sample to test, the impacts of technology penetration and advancements extend to all generations worldwide. Thus, further research that would include all generations across the world could prove to be of great value for further understanding of the problem at hand.

This study research revealed that the time spent on connecting to SNS through SPs is an important predictive factor in choosing the way of social interaction in young adults. The students who spent more time connecting to SNS through their SPs tended to prefer virtual social interaction (SNS) over real-life interaction in most instances. This finding, although not fully supported only adds to the previous research and provides a fertile soil for further research in this

area. Next, the tested subjects did not show symptoms of mental disorders related to the time they spent on connecting to SNS through their SPs. However, among those who spend three or more hours per day on SNS, a trend to positively answer to the questions related to mental disorders was noticed. Interestingly, the same trend did not exist among those who spend less than half an hour or less than two hours per day for connecting to SNS through their SPs. Thus, further research is suggested to investigate the occurrences of symptoms and emotions related to mental disorders in those who use their SPs for connecting to SNS excessively.

Finally, this research study revealed an interesting finding that those who spend more time connecting to SNS through their SPs, tend to suffer from symptoms of sleep deprivation. This finding only supports the already researched area of SP's and SNS' addictive nature. Accordingly, the loss of productivity was revealed as well. Since students need to sleep in order to be fully productive, this finding is interesting enough to be explored further.

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Appendices

Appendix A – English Survey Questions (RIT Croatia)

How using Social Networking Sites through Smartphones Affects Mental Health of Students

Q1 What is your gender?

- Male
- Female

Q2 How old are you?

- Between 18-22
- Younger than 18
- Older than 22

Q3 Do you have a smartphone and use it actively to connect to Social Networking Sites (SNS) (Facebook, Instagram, Twitter, Snapchat, WhatsApp, Viber, Pinterest, Vine, Tumblr, LinkedIn, Google+, Google Hangouts, YouTube, or other)?

- Yes
- No

Q4 What is the average amount of time per day you spend on SNS? *

- Less than half an hour
- More than half an hour, but less than two hours

- Three hours or more

Q5 What is the average amount of leisure/social time per day you spend face-to-face with others?

- Less than half an hour
- More than half an hour, but less than two hours
- Three hours or more

Q6 Do you post/like/comment on SNS more than three times per day?

- Yes
- No

Q7 Do you receive more than three likes/comments per day on your posts on SNS?

- Yes
- No

Q8 Check what is true for you.

8_1 SNS' (like Facebook) friends I've never met are as important to me as "real" friends

8_2 I rely too much on SNS to stay in touch with people

8_ 3 I've improved my ability to communicate and my ability to work out problems by using Facebook

8_4 I've unfriended someone on Facebook instead of talking about it

8_5 Social networking has made a positive impact on society

8_6 Social networking makes friendships stronger

Q9 Have you ever ended an intimate relationship with someone by sending a message on Facebook or any other SNS?

- Yes
- No

Q10 Check what is true for you.

Q10_1 I make an effort to spend real time with friends

Q10_2 I solve problems with friends face-to-face

Q10_3 People who rely on social networking are losing the ability to talk with others

Q10_4 Communicating using social networking is generic and impersonal

Q10_5 It's easy to take things the wrong way during social networking

Q11 I prefer to keep in touch with others by...

- By using SNS
- By talking in person

- By some other method

Q12 I prefer to let someone know I'm upset by...

- By talking in person
- By posting text/picture/emoticon/changing status on SNS
- By not doing anything
- By some other method

Q13 When I do not have my smartphone, I feel disconnected

- Yes
- No

Q14 I feel out of touch when I haven't logged onto my SNS for a day

- Yes
- No

Q15 Using smartphone for SNS takes a lot of my time, which I should have spent on studying or working

- Yes
- No

Q16 Check what is true for you.

Q16_1 I am forced to change habits to adapt to new developments in smartphones and SNS

Q16_2 I feel my personal life is being invaded by smartphones and SNS technologies

Q16_3 I am threatened by people with newer smartphones and SNS technology skills (a.k.a. I need to have the newest version of iPhone and be active on most popular SNS)

Q16_4 I have to sacrifice my personal time to keep current on new smartphone and SNS technologies

Q17 I find it hard to control my use of smartphone for connecting to SNS

- Yes
- Maybe
- No

Q18 I check for missed calls/messages/posts/comments/likes during the night, when I am supposed to sleep, or if I accidently wake up during the night

- Often
- Sometimes
- Never

Q19 Check what is true for you.

Q19_1 I risked an important relationship, a job, an academic opportunity or a career development opportunity because I overuse my smartphone for SNS

Q19_2 I can't concentrate in class because I have to check my smartphone for SNS activity

Q20 Do you often feel rejected when no one likes/comments your post/photo/status on SNS?

- Yes
- No

Q21 Do you feel low self-esteem, depressed, or anxious when you see that your friend has received more likes/comments on his/her post/photo/status on SNS than you?

- Yes
- No

Q22 Check what is true for you.

Q22_1 I often get angry if someone interrupts me while I use my smartphone for SNS

Q22_2 I try not to check my smartphone for SNS activity so often, but I fail

Q22_3 I use my smartphone to check SNS even when talking or eating with others

Q23 Check what is true for you.

Q23_1 I keep my smartphone on 24 h a day

Q23_2 I feel like my smartphone is ringing or vibrating (a.k.a. SNS notifications coming), but it isn't

Q23_3 Others complain about me spending too much time on my smartphone for SNS

Q23_4 I feel uneasy in places where mobile phone usage is prohibited

Q23_5 I feel as if I am with someone when I use my smartphone for SNS

Q24 How do you feel when your SP has no minutes, battery charge, or is out of range?

Q24_1 Anxious

Q24_2 Distressed

Q24_3 Agitated

Q24_4 Afraid

Q24_5 Disoriented

Q24_6 Normal

Q25 Have you experienced any of the following symptoms or emotions due to not being able to use SNS for some period?

Q25_1 Tachycardia

Q25_2 Tremors

Q25_3 Sweating

Q25_4 Changes in respiration

Q25_5 Depression

Q25_6 Loneliness

Q25_7 Rejection

Q25_8 Panic

Q26 Check what is true for you.

Q26_1 I have hard time to fall asleep because I wonder what is going on SNS

Q26_1 I am often sleep deprived because I spent too much time on SNS

* Grouping question

Appendix B – Croatian Survey Questions (VERN)

Utjecaj vremena provedenog na društvenim mrežama putem smartphone-a na kvalitetu života studenata

Q1 Spol

- Muško
- Žensko

Q2 Dob

- Između 18-22
- Mlađi/a od 18
- Stariji/a od 22

Q3 Da li imaš smartphone (pametni telefon) koji aktivno koristiš za povezivanje na društvene mreže?

(Facebook, Instagram, Twitter, Snapchat, WhatsApp, Viber, Pinterest, Vine, Tumblr, LinkedIn, Google+, Google Hangouts, YouTube, or other)?

- Da
- Ne

Q4 Koliko u prosjeku provodiš vremena na društvenim mrežama dnevno?*

- Manje od pola sata
- Više od pola sata, ali manje od dva sata
- Tri sata ili više

Q5 Koliko svog slobodnog vremena u prosjeku provodiš na direktni kontakt (licem-u-lice/uživo) sa prijateljima ili drugim ljudima?

- Manje od pola sata
- Više od pola sata, ali manje od dva sata
- Tri sata ili više

Q6 Da li u prosjeku postaš/lajkaš/komentiraš na društvenim mrežama više od tri puta na dan?

- Da
- Ne

Q7 Da li u prosjeku dobivaš više od tri lajka ili komentara na svoje postove/status ili slike koje si objavio na društvenoj mreži?

- Da
- Ne

Q8 Izaberi što smatraš istinitim za sebe (moguće je odabrati više odgovora):

8_1 Prijatelje sa društvenih mreža (poput Facebook prijatelja) koje nisam nikada upoznao uživo, smatram jednako važnima kao i svoje prave prijatelje

8_2 Imam osjećaj da se previše oslanjam na društvene mreže kako bih ostao u kontaktu s ljudima

8_ 3 Mislim da su društvene mreže poboljšale moju sposobnost komuniciranja i rješavanja problema s ljudima

8_4 Jednom ili više puta sam skinuo nekoga s liste prijatelja (unfriend) bez da sam o tome s njime/njome razgovarao

8_5 Društvene mreže pozitivno utječu na društveni život

8_6 Društvene mreže čine prijateljstva dubljim i jačim

Q9 Da li si ikada prekinuo/la intimnu vezu s nekime tako da si ga/ju o tome obavjestio putem društvene mreže?

- Da
- Ne

Q10 Izaberi što smatraš istinitim za sebe (moguće je odabrati više odgovora):

Q10_1 Smatram da ulažem puno truda kako bih što više svog slobodnog vremena proveo uživo sa svojim prijateljima

Q10_2 Probleme i konflikte koje imam s prijateljima, rješavam razgovorom uživo

Q10_3 Ljudi koji se previše oslanjaju na društvene mreže gube sposobnost normalnog komuniciranja s ljudima

Q10_4 Komunikacija preko društvenih mreža je jednostavno platonska (plitka) i nedovoljno iskrena

Q10_5 Vrlo je lako krivo protumačiti komunikaciju na društvenim mrežama (izvaditi riječi iz konteksta)

Q11 Preferiram održavati kontakt sa svojim prijateljima i drugim ljudima...

- Putem društvenih mreža
- Razgovorom uživo
- Nekako drugačije

Q12 Kada nisam dobro (npr. kada sam uzrujan/a) želim da to drugi saznaju...

- Tako da uživo o tome popričamo
- Tako da postam tekst/sliku/emoticon ili promijenim status na društvenoj mreži

- Ne činim ništa da to itko sazna

Q13 Kada nemam svoj smartphone (pametni telefon) pri ruci, osjećam se emotivno i/ili čak fizički odsječen/a od svijeta i/ili ljudi

- Da
- Ne

Q14 Ako se ne ulogiram na društvenu mrežu barem jednom dnevno, osjećam se kao da sam izvan svih važnih društvenih događanja.

- Da
- Ne

Q15 Smatram da provodim previše vremena za povezivanje na društvene mreže putem svog smartphone-a (pametnog telefona), a na uštrp učenja i/ili posla.

- Da
- Ne

Q16 Izaberi što smatraš istinitim za sebe (moguće je odabrati više odgovora):

Q16_1 Da bih ostao u toku sa napretcima u tehnologiji smartphone-a (pametnih telefona) i društvenih mreža, moram mijenjati svoje navike (npr. ne mogu se baviti sportom)

Q16_2 Imam osjećaj da tehnologije smartphone-a (pametnih telefona) i društvenih mreža djeluju agresivno na moj privatni život (osjećam se kao da nikada nemam mira)

Q16_3 Osjećam se manje vrijednim ako nemam najnoviji smartphone uređaj i ako nisam aktivan na najpopularnijoj društvenoj mreži

Q16_4 Osjećam se kao da moram žrtvovati svoje slobodno vrijeme kako bih održao/la korak s najnovijim tehnologijama smartphone-a (pametnih telefona) i društvenih mreža

Q17 Imam osjećaj da **ne** mogu kontrolirati uporabu svog smartphone-a za povezivanje na društvene mreže

- Da
- Možda
- Ne

Q18 Provjeravam svoj smartphone za propuštene pozive/poruke/komentare/lajkove čak i tokom noći kada bih trebao/la spavati, ili ako se slučajno probudim usred noći

- Često
- Rijetko
- Nikada

Q19 Izaberi što smatraš istinitim za sebe (moguće je odabrati više odgovora):

Q19_1 Zbog pretjeranog povezivanja na društvene mreže putem svog smartphone-a, riskirao/la sam priliku za posao, akademsku priliku i/ili priliku za napredovanje u karijeri

Q19_2 Ne mogu se koncentrirati na satu jer stalno provjeravam svoj smartphone da vidim što se događa na društvenim mrežama

Q20 Da li se ikada osjećaš društveno odbačenim/neprihvaćenim ako nitko nije komentirao/lajkao tvoj post/sliku/status na društvenoj mreži?

- Da
- Ne

Q21 Da li osjećaš manjak samopouzdanja, tjeskobu ili postaneš depresivan/a ako je tvoj prijatelj dobio više lajkova/komentara na njegov/njezin post/sliku/status na društvenoj mreži od tebe?

- Da
- Ne

Q22 Izaberi što smatraš istinitim za sebe (moguće je odabrati više odgovora):

Q22_1 Jako me razljuti kada me netko prekine dok koristim svoj smartphone za povezivanje na društvene mreže

Q22_2 Pokušavam ne tako često provjeravati svoj smartphone i što se događa na društvenim mrežama, ali svi moji pokušaji su bezuspješni

Q22_3 Koristim svoj smartphone za povezivanje na društvene mreže čak i kada razgovaram s ljudima ili jedem u društvu

Q23 Izaberi što smatraš istinitim za sebe (moguće je odabrati više odgovora):

Q23_1 Moj smartphone je uključen od 0-24 svaki dan u tjednu

Q23_2 Katkada mi se čini da mi smartphone vibrira ili zvoni (kao da sam dobio obavijest sa društvene mreže), ali to nije slučaj

Q23_3 Često mi se događa da se drugi žale kako provodim previše vremena povezujući se na društvene mreže putem svog smartphone-a ("Skini se više s tog telefona!" ili "Što buljiš u taj telefon toliko?")

Q23_4 Osjećam se nelagodno na mjestima gdje je zabranjeno koristiti mobilne uređaje

Q23_5 Kada se povežem na društvenu mrežu putem smartphone-a, osjećam se kao da sam s nekim (fizičkom osobom)

Q24 Kako se osjećaš kada ti se isprazni baterija, nemaš signala, ili jednostavno nemaš novaca na računu na svom smartphone-u? (moguće je odabrati više odgovora)

Q24_1 Tjeskobno

Q24_2 Tužno

Q24_3 Uzrujano

Q24_4 Uplašeno

Q24_5 Dezorijentirano

Q24_6 Normalno

Q25 Da li si ikada osjetio/la ijedan od sljedećih simptoma ili emocija kao posljedicu nemogućnosti povezivanja na društvene mreže? (moguće je odabrati više odgovora)

Q25_1 Ubrzan rad srca

Q25_2 Drhtanje

Q25_3 Preznojavanje

Q25_4 Ubrzano disanje

Q25_5 Depresija

Q25_6 Osjećaj usamljenosti

Q25_7 Osjećaj odbačenosti od društva

Q25_8 Panika

Q26 Izaberi što smatraš istinitim za sebe (moguće je odabrati više odgovora):

Q26_1 Često ne mogu zaspati jer razmišljam o tome što se događa na društvenim mrežama

Q26_1 Često mi se događa da sam neispavan/a jer sam previše vremena proveo/la na društvenim mrežama (na svom smartphone-u) večer prije

* Grouping question

Appendix C – Introductory Email for RIT Croatia Students

From: Allusers [mailto:allusers-bounces@acmt.hr] **On Behalf Of** Maja Bracic (RIT Student)

Sent: Wednesday, April 05, 2017 12:27 AM

To: allusers@croatia.rit.edu

Subject: [ACMT allusers list] Am I addicted to my smartphone and social networks?

Hello,

Are you currently reading this email on your smartphone?

Do you use "airplane mode" only if you are actually on an airplane (it's called integrity)?

Do you sometimes feel a phantom vibration even when your phone is not in your pocket/purse?

Do you curl up in a fetal position when nobody likes your photo or post on Facebook/Instagram/Snapchat?

Have you ever unfriended someone on Facebook without actually talking with that person beforehand?

Addiction to smartphones and social networks is no joke. And if you answered YES to any of the above questions, then you are probably wondering how addicted you might be... Whether you think you have control over using your smartphone for social networks or not, this survey could help you understand the proportions of your addiction (if you are, indeed, addicted). Thus, please click on the link below to complete the survey, which could contribute immensely to both, the self-inquiry of the depth of your relationship with your smartphone and social networks and help me complete my Master of Science capstone project.

https://rit.az1.qualtrics.com/jfe/form/SV_8pmU4uid7lhi51j

With kind regards,

Maja Bračić.

Appendix D – Introductory Email for VERN Students

Jeste li ovisni o svom smartphone uređaju i društvenim mrežama?*

Dopadalo nam se to ili ne, korištenje novih komunikacijskih tehnologija nas mijenja. Primjerice, virtualna prijateljstva počinju zamjenjivati prava prijateljstva i to putem društvenih mreža koje najčešće koristimo preko svojih smartphone uređaja…

Kako to utječe na kvalitetu našeg života? Osjećamo li se zbog svega toga tjeskobno, depresivno, odbačeno ili uznemireno? Jesmo li postali ovisni o svojim smartphone uređajima i društvenim mrežama? Budimo li se neispavani zbog nemogućnosti kontroliranja 106mpulse svoje ovisnosti? Utječu li društvene mreže i na našu produktivnost, akademski uspjeh i razinu stresa?

Ovo se područje s razlogom sve više istražuje. Želite li dati svoj doprinos studiji koja se bavi ovom temom, popunite upitnik na sljedećem linku:

https://rit.az1.qualtrics.com/jfe/form/SV_5nj4UsgJnErftn7

Najljepše zahvaljujem na suradnji…

Maja Bračić.

*rewritten from Višnja Grozdanić's email (which follows), since the author never received the original email**

**Poštovani Maja i Vanja,

u nastavku je moj prijedlog.

Naslov poruke je **Jeste li ovisni o svom smartphone uređaju i društvenim mrežama?** A tekst je sljedeći:

Dopadalo nam se to ili ne, korištenje novih komunikacijskih tehnologija nas mijenja. Primjerice, virtualna prijateljstva počinju zamjenjivati prava prijateljstva i to putem društvenih mreža koje najčešće koristimo preko svojih smartphone uređaja...

Kako to utječe na kvalitetu našeg života? Osjećamo li se zbog svega toga tjeskobno, depresivno, odbačeno ili uznemireno? Jesmo li postali ovisni o svojim smartphone uređajima i društvenim mrežama? Budimo li se neispavani zbog nemogućnosti kontroliranja impulsa svoje ovisnosti? Utječu li društvene mreže i na našu produktivnost, akademski uspjeh i razinu stresa?

Ovo se područje s razlogom sve više istražuje. Želite li dati svoj doprinos studiji koja se bavi ovom temom, popunite upitnik na sljedećem linku:

https://rit.az1.qualtrics.com/jfe/form/SV_5nj4USgJnErftn7

Zahvala na suradnji!

Odjel za komunikacije

Kako vam se čini? Pokriva li termin komunikacijskih tehnologija i smartphone i društvene mreže?

Srdačan pozdrav,

Mr.sc. Višnja Grozdanić, viši predavač
Prodekanica za studije / Vice Dean
Veleučilište VERN' / VERN' University of Applied Sciences
Trg bana Josipa Jelačića 3, HR - 10000 ZAGREB
T. +385.1.4825.926, F. +385.1.4825.910
E. visnja.grozdanic@vern.hr, W. www.vern.hr

From: Maja Bracic (RIT Student) [mailto:mxb4874@rit.edu]

Sent: Thursday, March 30, 2017 3:53 AM

To: Vanja Koljan <vanja.koljan@vern.hr>; Visnja Grozdanić <visnja.grozdanic@vern.hr>

Subject: Link na anketu i objašnjenje...