

An Analysis on the Relation between Users' Online Social Networks Addiction and Users Security Concerns

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Abstract: Use of online social network platforms has increased over last decades. There are various activities that users can do on those platforms such as, making friends, enjoying time, making business, and education. Given activities make online social network platforms more attractive and users want to spend more time on those platforms. Although there is a massive increment in their use, they are not secure enough to fully protect their users' data and privacy. Some users are not aware of the security settings (*i.e. privacy settings*) since most users focus on spending time on those platforms which brings online social networks addiction into the consideration. Addiction is defined with time dependency in most of the literature works, however, calling a person as an addicted person depends on various factors. This work provides three main contributions;

- 1-) It clarifies the definition of addiction with a quantitative model.
- 2-) It provides an analysis on online social networks addiction; answers the question "whom could be called as an addicted user to those platforms"
- 3-)It provides an analysis on users' trusts to online social networks platforms.

1 INTRODUCTION

The popularity of online social networks (OSNs) platforms has brought a new way of communication to today's world. OSNs users connect to each others, create groups or join to groups. There are various reasons that make people to join to OSNs platforms, such as, business, education, and enjoyment. Since OSNs' platforms provide a virtual environment where location is not matter. Users can make commerce with users who are not in the same city or not even in the same country via those platforms. All these opportunities make those online platforms more attractive and encourage users spend more time on OSNs platforms.

Nowadays, users are not able control their time and themselves in OSNs platforms. There are research have been done for analysing users online social media addiction, for example, the risks of time distortion was discussed in (Turel et al., 2018). They first differentiated that addiction or time consuming are not the right terminologies from the psychological point, then they agreed that users spend most of their time on OSNs platforms. There is a study in which a model was developed to analyse what is the risk point to understand whether a user is addicted

to OSNs platforms (Monacis et al., 2017). Understanding the risk point is not quite easy since each person has different life perspective and each person is analysed as a unique case in the psychology (Skaggs, 1945). Based upon the studies on OSNs addiction, many online platforms' users spend most of their time on their online accounts. Some online platforms users accept their addiction to OSNs platforms and get psychological support to use their time effectively on their OSNs accounts (Kuss and Griffiths, 2011).

Time consuming is not the only concern for OSNs' platforms users they are also worried about their privacy in OSNs. There are privacy policies in most of OSNs platforms for example Facebook provides privacy setting to its users for controlling their data flow (Schechner and Secada, 2019). Some of online platforms' users do not either even know what is privacy settings and where do their data go or they aware of settings but do not know how to use online platforms in a secure frame. Even-though OSNs platforms service providers provide user privacy settings, users, who adjust their privacy settings, still do not feel fully secure in online platforms (Ayaburi and Treku, 2020). Users share photos, videos and texts which can disclose users' private information such as

their identity, their addresses, and their locations.

The main concerns of OSNs can be classified into two categories; first one is privacy concern and second is time. This study first provides an analysis on the most popular OSNs platforms based on their daily active users. It also discusses benefits and drawbacks of OSNs platforms. Its main aim is to analyse users' addiction and privacy concerns in OSNs platforms. In order to achieve its main aim, a questionnaire is prepared and conducted with online forms. Participants are active users of various popular social network platforms, such as Facebook, YouTube, Instagram, WeChat, and Twitter. This paper answers following research questions;

RQ1: What are the factors to understand whether a user is indulgent to OSNs or not?

RQ2: Do users trust to OSNs from the security point of view therefore they share their contents on OSNs platforms?

The rest of this work is organised as follows; Section 2 discusses similar works in the area of online social networks. The methodological steps and results of the experiments are given in Section 3. We then discussed our results in Section 4. Finally, this work is concluded with future directions in Section 5.

2 RELATED WORKS

2.1 Security Concerns

Threats on OSNs have been addressed by researchers and industries. OSNs threats are spam, malware, phishing attacks, spam attacks, cross-site scripting, click-jacking, de-anonymization attacks, fake profiles, identity clone attacks, information leakage, location leakage, cyberstalking, user profiling, and surveillance (Ali et al., 2018). Information leakage, location leakage, user profiling, and surveillance could be classified as modern threats since doing those attacks does not require a deep knowledge in security area which makes them much easier than other attacks.

The impacts of modern attacks in OSNs platforms open doors to future attacks and/or threats (Molok et al., 2010). For example, a location leakage might cause robbery. OSNs platforms users are now permitted share their live locations on their accounts (Li and Chen, 2010). Let us think a scenario in which a user shares his live location on his OSNs account and there is a burglar waits him to be far from his home. When the burglar sees that the users posts his location and the shared location shows the users is far from his

home, then the burglar can do burglary. The problem in here is that users do not know or are not aware that a content sharing in OSNs might cause serious problems on their lives. Most of the times users get regretted because they share contents which cause serious problems on their lives (Wang et al., 2011).

2.2 Time Consuming Concerns

OSNs platforms addiction has been an attractive area (Andreassen, 2015). Facebook is one of the most popular OSNs platform, users addiction to Facebook was discussed in (Guedes et al., 2016). That work's results showed that most of people use the Internet for just using Facebook platform and many users addicted to Facebook. OSNs addiction is commonly seen o young people, they are more intolerant than other users (Enrique et al., 2010).

Users who are addicted to OSN platforms become a lonely people after a while because they prefer to communicate with OSNs users rather than their relatives or real-life friends (Yao and Zhong, 2014). *Andreassen et al.* observed that students who are addicted to OSNs platforms have difficulties for concentration because they want to spend more time on OSNs platforms (Andreassen, 2015).

Over use of OSNs platforms cause mental problems, OSNs users get depressed if they can not control their times (Pantic, 2014). *Aviv et al.* worked on a study which supports studies of OSNs addiction (Weinstein et al., 2015). The study showed that OSNs cause anxiety on young people, they get anxious if they can not login to their OSNs accounts and it makes them aggressive.

Above studies worked on OSNs addiction on different age groups and results of OSNs addiction. Different from above studies this work first gives factors which need to be seen in that person to call that person addicted. Because addiction relates to various factors not just time. This work then discusses its results comparatively with similar works in the area of OSNs addiction.

3 METHOD AND EXPERIMENTAL STUDY

3.1 Participants

A total 1910 participants were recruited mainly from public. Of these, 898 Turkish (47%), 629 British (32%), 30 Chinese (1.5%), and 353 (18%) did not specify their nationalities. The first criteria was to

check whether participants are users of any OSNs platforms. In order to check that, the first question was "do you have an account an OSNs platform?", which was a *YES-NO* question. If a participant chose *No* option, then that questionnaire was not taken into the consideration for this study.

Participants are classified based on online social networks they used. Figure 1 presents five online social network platforms and the number of participants from those online platforms.

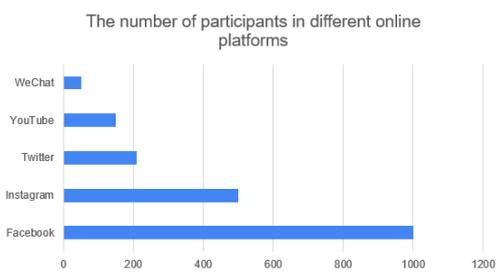


Figure 1: The number of participants in different online platforms.

3.2 Methodological Steps

A questionnaire was prepared for achieving the aim of this study. All questions in the questionnaire were multiple choices the reason for this to make users participation easier. After preparing the questionnaire, we disseminated it by using different online platforms such as Facebook, Instagram, WeChat, Twitter, YouTube, and e-mail service.

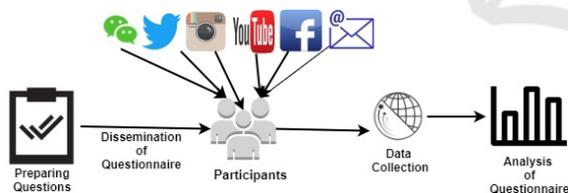


Figure 2: Methodological steps of the study.

3.3 Analysis of Experimental Study

We first asked participants their ages, this is important because it will guide us to answer this study's research questions. The question on questionnaire was "Which group of age do you belong to?". Figure 3 indicates the participants groups and the proportions. Participants whose ages are between 5-10 and 10-15 use Facebook. This is important because Facebook is used for educational purpose by teachers and students (Hew, 2011). Results in Figure 4 can be used as a support to work in (Hew, 2011). When we analysed the intersection of the question about participants ages

and their jobs, we saw that participants, whose ages are between 5-20, are Facebook users. Because, this age group is also known as studentship ages.

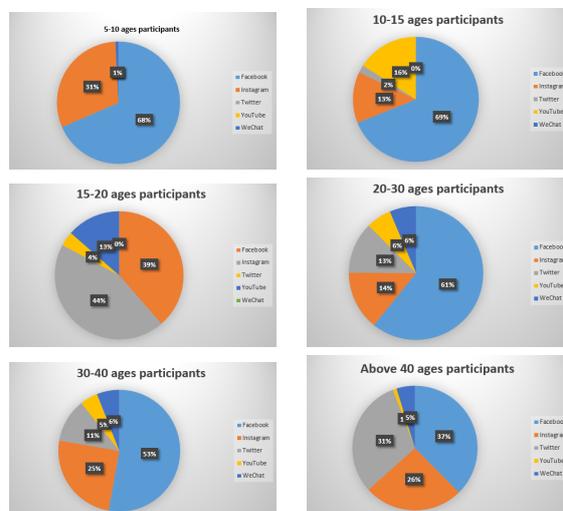


Figure 3: Participants' ages groups and proportions.

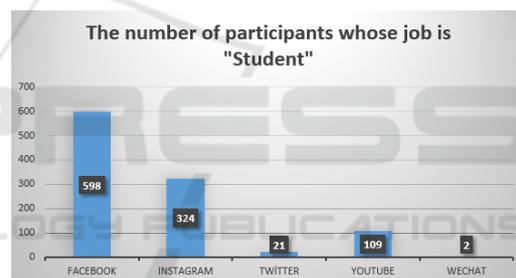


Figure 4: The number of participants who are students.

The next question is related to the number of online social networks accounts that users have and use actively. Figure 5 presents the result of analysis on the number of online social accounts that participants have and use actively. When the details of the participants' answers were zoomed in, YouTube users, Twitter users, and WeChat users have accounts on other online social platforms. This might be most people around the world prefer to use Facebook, Instagram, and YouTube. So that the number of users on those platforms are much more higher than other social platforms. The purpose of using OSNs platforms is an important factor for this study. We therefore asked participants "which what purpose they use their OSNs accounts". Figure 6 shows the results of analysis on the participants' purposes to use their OSNs platforms. Most of participants use their online accounts for enjoying their times. Based on the results, Facebook is the most used online platform for education purpose, this is interesting because YouTube has

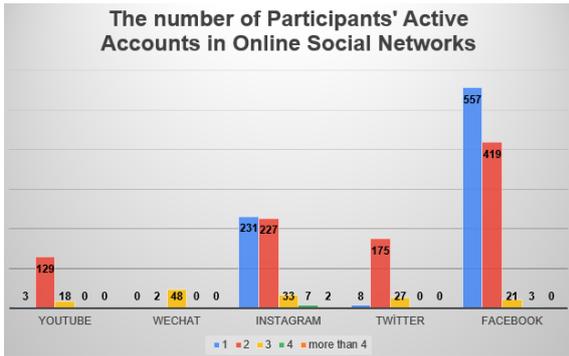


Figure 5: The number of accounts that participants have and use actively.

a very good impact on the education for last decades (Moghavvemi et al., 2018). Although Facebook is used by teachers and student for educational purpose (Hew, 2011), it is mostly used and known for enjoyment.

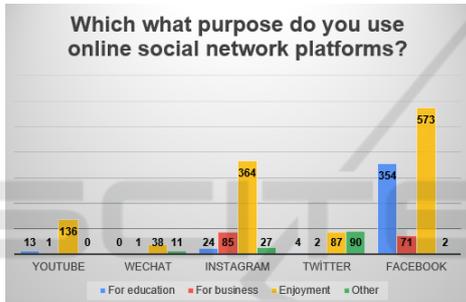


Figure 6: Purposes of users to use their OSNs accounts.

The definition of addiction was done in (Sinnott-Armstrong and Pickard, 2013). In that work, if three of following factors are seen in a person, then it can be claimed that person is addicted. Those factors are as follows; 1-) using something more than was intended, 2-) withdrawal, 3-) persistent desire or unsuccessful efforts to control use, 4-) a great deal of time spent obtaining using, or recovering, 5-) tolerance, 6-) reduction in other important activities because of use, 7-) continued use despite knowledge of its causing a persistent or recurrent physical or psychological problem. Defining someone as an addicted person is quite difficult because just one factor among those seven factors is not enough to call a person addicted. With the respect of Sinnott et al. definition on addiction, this term can be expressed with a quantitative model. Those determinant seven factors can be used as components of the intended mathematical model. The order of determinative factors is not important so that we can use *Combination* for addiction modelling. Table 1 show the abbreviation of determinant factors for addiction are used in the developed quantitative model.

Table 1: The abbreviation of factors.

Factor	abbreviation
More than intended	UI
Withdrawal	W
Unsuccessful effort to use	UC
Time	T
Tolerance	To
Reduction in other activities	R
Cause persistent or recurrent problem	P-R P

The addiction is defined by the next expression:

$$A(f, n) = \binom{f}{n} = \frac{f!}{n!(f-n)!} \quad (1)$$

where

$$3 \leq n \leq 7$$

In Equation 1, A is a function that expresses addicted, this function depends on f and n . f expresses factors which are defined in (Sinnott-Armstrong and Pickard, 2013) and n expresses the number of the factors.

This work's questionnaire had three questions related to use of time in OSNs platforms, tolerance, reduction in other activities. Figure 7 and Figure 8 show the results of analysis to understand whether participants are addicted to OSNs platforms or not. We discussed the results in the light of three factors;

- 1 Tolerance (To):** Participants were asked how they feel if they can not log into OSNs platforms. Our analysis showed that almost half of Facebook users feel aggressive when they can not log into their online social accounts.
- 2 Time (T):** Amount of time using in OSNs platforms was another question on the questionnaire. Participants especially have accounts in YouTube, Facebook, and Instagram spent a great of time on their OSNs accounts.
- 3 Reduction in Other Important Activities (R):** Participants were asked "do they postpone or ignore their works because of spending time on their OSNs accounts". Our analysis on that question showed us Facebook and Instagram users reduce their work time because they spend more time in OSNs platforms.

Figure 9 presents the result of analysis on the factor R : *Reduction in other important activities*. We asked users whether they postpone or ignore their important activities because they are on their OSNs accounts. Our analysis showed that considerable amount of participants postpone their important activities because they prefer being on their online accounts. Participants also were given questions related the security point of this study. One was

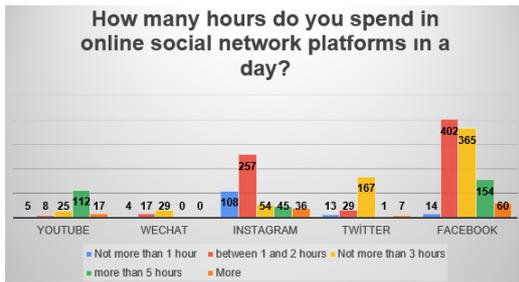


Figure 7: The amount of time that participants spent in OSNs platforms.

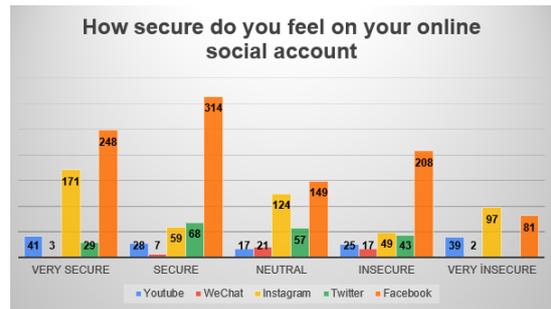


Figure 10: The result of analysis on the question related directly to security.

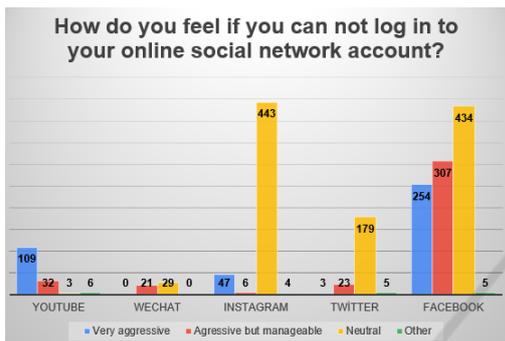


Figure 8: Tolerance analysis.

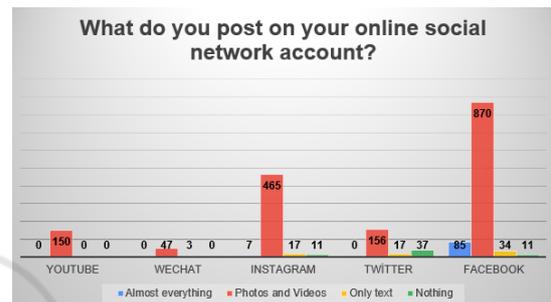


Figure 11: The result of analysis on contents.

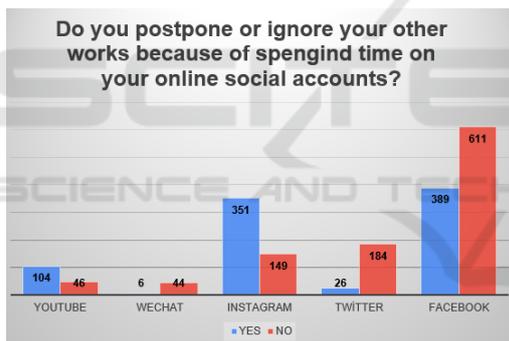


Figure 9: Reduction in other important activities analysis.

related to content of data they share on OSNs platforms, Figure 10 presents the result of analysis on that question. Only participants from Facebook chose the option "Almost everything" for the question what they post to their Facebook accounts.

Figure 11 demonstrates the analysis on the contents that are shared by participants on their OSNs accounts. The analysis showed that majority of the participants post photos and videos however there was eighty-five participants on Facebook share almost all their activities on their accounts. The interesting points was on the intersection of Figure 10 and Figure 11 because participants who post photos, videos, or everything even if they do not feel secure on OSNs platforms. For example, some of participants who chose they post videos and photos on Instagram are also the ones who chose they feel either *insecure* or

very insecure. We asked participants that would they continue to post their data to OSNs if they know the contents that they post on OSNs platforms can not be deleted from the Internet? Figure 12 demonstrates the results of related the question. 837 participants chose "Yes" option. This is quite interesting because users still are decisive to share their data even if they leave foot-prints behind them on those platforms.

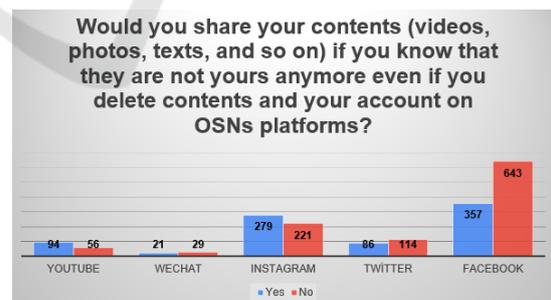


Figure 12: The result of analysis on awareness 1.

The last question on the questionnaire was related to that users are more known by OSNs than their relatives. We asked participants how much do they believe that? In total 1805 participants either *Agreed* or *Completely Agreed*.

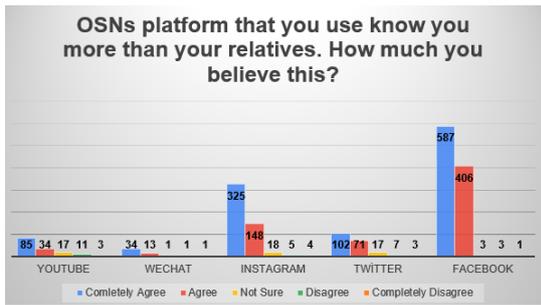


Figure 13: The result of analysis on awareness 2.

4 DISCUSSION

Today, OSNs platforms are new channels for communication. Almost everyone has at least one accounts on popular OSNs accounts, such as, Facebook, Instagram, YouTube, Whats-app, and Twitter.

OSNs users sometimes share their all activities without considering what they might face from the security point of view on OSNs platforms (McConnell et al., 2018). In order to protect users privacy and protect users data, OSNs platforms create their own policies (Toch et al., 2010). Users are responsible to adjust their privacy settings on OSNs platforms which means that if a user does not know what are privacy settings or how to manage privacy settings, then there is no guarantee to have a safe environment on those platforms. Young people are more eligible to manage their privacy settings on OSNs platforms while older people do not even know what security and privacy means on those platforms (Blank et al., 2014). Users who do not know security settings and/or privacy settings on OSNs platforms, are more vulnerable to possible security issues. One of the most common threat on those platforms is information disclose; users expose their friends information either intentionally or unintentionally (Nosko et al., 2010). Location information disclosure is an example of information disclose and it is a very common threat because OSNs users like sharing their locations to show others places which are visited by them (Sun et al., 2015). Location information disclose is dangerous because it underlies some burglaries in today's world. Two questions results, which are related to security point of this study, can be discussed together; one asks "How secure do you feel on your online social account?" and the other one asks "What do you post on your online social networks account?". The total number of participants who said they feel insecure in OSNs platforms is 561 where 289 are Facebook users, 43 are Twitter users, 146 are Instagram users, 19 are WeChat users, and 64 are YouTube users. The interesting point of those two questions is on the intersection, participants who

feel insecure in Facebook are the same people who choose the option "Almost everything" for the question "What do you post on your online account?".

Time is the most valuable thing that can not be taken back in this life. Spending hours in OSNs platforms are defined an addiction in (Guedes et al., 2016). Researchers then start working to decrease time that is spent in OSNs platforms (Esmaili Rad and Ahmadi, 2018)(James et al., 2017). It has been claimed in those research works that if someone spends more than four hours, then that user can be called addicted to OSNs platforms. However, spending an amount of time is not enough to define a person addicted as it is explained in the previous sections. Equation 1 expresses the definition of addicted person in a quantitative way in which combination of factors is used. We now look into the details of our results to see a whether any of our participants is addicted or not? We then we tried to know how many of the participants are addicted? To do so, we first analysed all questionnaires from the beginning to find out the number of participants who are in the intersection of three questions; these questions are "Do you postpone or ignore your other works because of spending time on your online social accounts?", "How do you feel if you can not log in to your online social network account? ", and "How many hours do you spend in online social network platforms in a day?".

Figure 14 shows the result of analysis on addiction in this research. Based on the results, 268 participants are addicted to OSNs platforms they use. Because those 268 participants can not tolerate if they can not log into their OSNs platforms accounts, they spend more than five hours on their online accounts, and they reduce time on their other important activities because of OSNs platforms use.

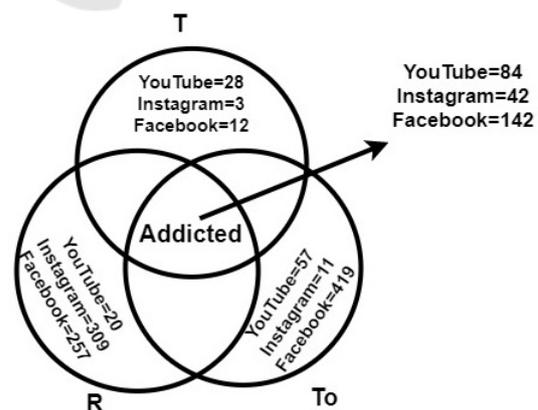


Figure 14: The number of addicted participants.

5 CONCLUSION

In this paper, we give an analysis on OSNs platforms; one is on users addiction to OSNs and the other one is users security awareness on those platforms. Before doing analysis, we clarified addiction meaning and modelled it in quantitative way. To do analysis, we disseminated our questionnaires on different OSNs platforms for data variety. Our analysis showed us OSNs users share almost everything on OSNs platforms without knowing what security issues they might face. The interesting point on the analysis was that users who share almost all their contents are the same users who are addicted to those platforms.

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