MOBILE TECHNOLOGY AND SOCIAL NETWORKS: MAPPING ARCHITECTURE STUDENTS' PRACTICE AND AWARENESS FOR EDUCATIONAL POSSIBILITIES

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Abstract

Mobile technologies are spreading our daily lives by the help of social media applications. Teenagers and young adults are among the highest percentage of smartphone and social media application users. As an apparent result colleges and higher education institutions are facing an increasing pressure to limit and control students' smartphone and social network use as these practices are accepted to be distracting. On the other hand, academicians are also tending to spend more time with their mobile devices and use social networks. At the brink of a connected World with the 'internet of things', it seems things will get tougher to leave these devices out of classrooms. Although the idea of using such applications for the good of education is being discussed for some time now, research on using such tools and technologies for undergraduate architecture students is far from being extensive. Besides, existing data and insights are postulant to become irrelevant with an unusual pace. By the help of a survey data this paper tries to pin undergraduate architecture students' smartphone and social network practice and discuss their possible consideration for educational purposes. Initial findings give clues about some of the web 2.0 tools can help students enhance their design activities.

Keywords: Mobile technology, smartphone, Web 2.0, social media, social network, architecture, education.

1   INTRODUCTION

Advancing Information and Communication Technologies (ICT) are reshaping our daily lives with an increasing pace. Mobile communication devices, especially the introduction of smart phones, changed the way we communicate both professionally and socially. Starting from the basic models of mobile phones text messaging began chasing the dominance of verbal communication by Short Message Service (SMS). Shortly after, instant messaging applications began chasing SMS dominance and e-mail took place of letters. Today, most of us prefer instant messaging to e-mails for personal and social relationships [1]. Traditional World Wide Web websites were primarily delivering information. They evolved by emphasizing user-generated content and Internet became increasingly interactive opening a new era called Web 2.0. On Web 2.0 it is mostly the user who creates the content. New kind of websites appeared that are dependent on their contributors. They produced online communities that made sharing every kind of information even easier. These online communities did not stay limited with web sites but using the mobile application technologies they became individual applications on our smartphones enabling us to be online all the time. These social networking services usually demand users to create a personal identity in return for enabling an ever connected social network. Today, mobile phones [2] and social network information became extension of ourselves. This situation is so momentous that there are border authorities seeking for for travellers' social media details for visa applications [3], just like the increasing tendency of bank and e-government web sites demanding a smartphone as your personal identity or a mobile phone number that belongs to you.

In their highly cited article Boyd and Ellison define social networks as: *"… web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system"* [4]. Although, the term Web 2.0 is derived from a trade fair name in 2004 [5] it evolved as the name for the technology that allows to create platforms to create interactivity. By the help of this technology, users can provide feedback and exchange information. Therefore, Social Media are the platforms created using Web 2.0 technologies. Social Networking sites are online web sites where users create profiles and build their own network with other users for social or professional reasons. Although there is a vast amount of patterns and

types, examples for social networks include (1) Social sites – Facebook, Twitter, MySpace, Google+; (2) Photosharing sites – Instagram, Flicker, PhotoBucket; (3) Videosharing sites – Youtube, Vimeo, Periscope; (4) Instant Messaging – WhatsApp, Facebook Messenger, Viber; (5) Professional networking sites – LinkedIn, Academia, Ning; (6) Blogs – Wordpress, Blogger.com, Thumblr, etc [5, 6],

According to "40 Essential Social Media Marketing Statistics for 2017" report, 75% of male internet users are on Facebook while female internet users are up by 83%. About one third of teenagers consider Instagram to be the most important social network by 32%. 81% of millennials check their twitter account at least once per day. About six in ten adults using Instagram are between 18-29 years old. 29% of internet users with college degrees use twitter compared to 20% with high school degrees or less. YouTube reaches more 18-49 year olds than any cable network in USA and that is substantial even for YouTube mobile. Almost 80% of time spent on social media platforms happens on mobile devices [7]. The report underlines that most of these statistics show a dramatic increase of involvement especially in the last decade [8].

Although social networks are borderless by their nature, geographic and cultural differences come into existence when the most popular social networks are the issue. If we look around the globe with the statistics of 2017 provided by the World Economic Forum [9], Facebook remains the most popular social network with more than 1.8 billion users followed by instant messaging networks WhatsApp and Facebook Messenger both with a number of around 1 billion users. However, in countries like China and Russia the dominant social networks are regional. In China where Facebook, Twitter and Instagram are blocked in some areas QZone is the top social network with 632 million users and favourite messaging aps are QQ and WeChat. Meanwhile VKontakte and Odnoklassniki are leading Russian social networks. In this context, Turkey looks more global despite being one of the six countries in the world that blocks social media (REF). With around 26 million Facebook users, Turkey rank fourth country in the world [10]. According to TurkStat, the state statistics institute of Turkey, 62,1% of total population aged between 16-74 years are active internet users and 82,4% of this active population use social media [11].

Before smartphones, the average time spent on a telephone was 18 minutes compared to the average 3 hours a day that we face today [12]. Therefore, it is quiet liable to acknowledge smartphones as the dominant driver of social media. However, there are some serious side effects of these technological advancement that we should also mention. Some researchers quote Internet as "… a socially connecting device that's socially isolating at the same time" [13]. As the flow of information increases day by day and by the help of social and technological inclusion that are all online, By the time you finish checking your e-mails and social networks, it is time to check your e-mail and social media accounts again. Researchers call this a ludic loop which is a process that gets you into a state of tranquillity such as the lulled state people are in while playing slot machines [12]. This state of comfort sooths the anxiety we live in and has a strong potential to drag us into an addiction if it begins to fulfil a missing psychological motive.

The addictive use of Internet is not a new phenomenon. This condition is commonly cited as "Internet addiction disorder" (IAD) whereas there are other terms used such as "pathological Internet use", "Internet abuse", digital media compulsion and virtual addiction [13]. Although it has been debated more than two decades, it is now considered quiet similar to other addictions like drug, alcohol and gambling which results in social, academic, and occupational impairment [14]. Teenagers and young adults are among the highest percentage of smartphone and social media application users [7]. Besides, studies reveal that young users are more at risk [15].

As an apparent result colleges and higher education institutions are facing an increasing pressure to limit and control students' smartphone and social network use as these practices are accepted to be distracting. On the other hand, it is not just the students but academicians are also tending to spend more time with their mobile devices and use social networks. The generation born roughly after 1980 is called "generation Y", "Millennials". or "Net Generation". The Net Generation is considered to have grown up in an environment they were regularly exposed to computer based technology. Current higher education is being shaped by these tech-savvy millennials and the advent of web 2.0. Technology is a critical part of students' learning environments—this is true for traditional brick-and-mortar classrooms as well as e-learning settings. "ECAR Study of Undergraduate Students and Information Technology" report released by Educause Center for Applied Research" (ECAR) in 2012 summarizes responses of about 100.000 students from 195 institutions around the world [16]. The report gathers information about the students' perceptions of technology, how different technologies effect their academic experience and contribute to their academic achievement. ECAR's report, named "Undergraduate Students and IT" explores technology ownership, use patterns, and

perceptions of technology among undergraduate students. Some of the key findings of the report are supporting the aim of this research: (1) Portable devices are the academic champions, and they are diverse in terms of brands and platforms. (2) Students want to access academic progress information and course material via their mobile devices, and institutions deliver. (3) Students believe technology benefits them, especially with regard to achieving their academic outcomes and preparing for future plans. (4) Students report that basic technologies have the greatest impact on their success. (5) Technology training and skill development for students is more important than new, more, or "better" technology. (6) When it comes to device preferences, the usability afforded by the larger screens and keyboards of laptops trumps the portability offered by tablets, but the line between the two is beginning to blur. (7) Students expect their instructors to use technology to engage them in the learning process, and instructors are responding [16].

Gikas and Grant are discussing both the advantages and disadvantages of learning with mobile computing devices such as smartphones [2] and state that Mobile computing devices and the use of social media created opportunities for interaction, provided opportunities for collaboration. Some researchers debated on adapting Facebook, Ning and other social networks as an educational medium [10], [17], others tried to implement blogs for educational activities [18], [19]. Most of these attempts' main purpose was to enhance the communication environment among students and teachers. Weblogs are found useful to create a personal space that gives a sense of ownership and the sense of ownership helps reduce the anxiety of online communication. However, some research did not succeed but reported experiences seem to suggest possible usage of blogs to support learning in different fields [20]. Page [21] used a supporting technique for design education where the most common use of applications were sharing and presenting work as opposed to creating it directly on the smart devices. Georgiev et.al. focused on decreasing the limitations of traditional education methods by using mobile learning as a new stage of distance learning (d-learning) and electronic learning (e-learning) [22]. Meanwhile Eryilmaz and Simsek focused on changing learning and teaching processes in adaptive environments such as flipped-classroom method in education [23] that features a variety of techniques included mobile device technology.

It is also possible to discuss this issue from the institutional perspective. Institutions insisting on Course Management Systems like Blackboard, eCollege etc. will have to invest heavily on these platforms and human resources to support them. On the other hand if emerging social media tools could be adapted and used wisely for educational purposes this financial burden could be lessened that local technology investment could be shifted into a universal investment [24]. Liu also argues that, "…with the aim of taking a full advantage of this public resource, knowing what students are using and how they are using the social media tools is absolutely necessary for schools and faculty to integrate those tools in teaching and learning activities" [24].

Moreover, potential of some emerging technologies like Virtual Reality (VR), Augmented Reality (AR). The "Internet of things" which is also called "Web 3.0" should also be taken into account. Although these technologies are still at the initiation stage, it seems inevitable that they will reshape many things in our daily life, in many industries and the education system. Efforts to use smartphones as the core technology of VR headsets also show compliance with the demands put forward in ECAR Study of Undergraduate Students and Information Technology. The report states that (1) students report that basic technologies have the greatest impact on their success and (2) technology training and skill development for students is more important than new, more, or "better" technology [16]. In other words, net-generation wants to use the technology in their hands to the best, instead of being introduced to high-end technological tools. At that point smartphones can be accepted as a maturing technology of tomorrow that we should use to full advantage with the social networks for the sake of educational purposes.

At the brink of a connected world with the 'internet of things', it seems things will get tougher to leave these devices out of classrooms. Although the idea of using such applications for the good of education is being discussed for some time now, research on using such tools and technologies for undergraduate architecture students is far from being extensive. Besides, existing data and insights are postulant to become irrelevant with an unusual pace. The potential long-term impact of the mobile computing devices, on the higher educational learning environment is yet to be determined [2]. In order to improve the student experience with technology at the educational institutions, we need to develop plans to learn more about our students' technology profile and interests [16].

In this context, this paper is part of a wider research trying to explore how we can utilize smartphones and widely used social networks for architectural design education. Architecture students' habitual behaviours for using Internet and smart phones, social network preferences, and social network usage

in the classrooms and for educational purposes are investigated. The architects, architectural offices and schools of architecture that students follow on social media are also inspected as additional information.

2   RESEARCH METHODOLOGY

Data collection is done by conducting questionnaire in April 2017. The structure of the questionnaire is developed using recent research studies [5], [25], [24] in order to obtain data about the social media and smart phone practices of architecture students. Survey questions are not grouped structurally on the form but planned in groups as follow: (1) Students' general perception and habitual approaches towards Internet usage, (2) Social networks they actively use, awareness of weblogs (3) Internet and Social network practices at the university (4) Their interest in architects, architectural offices and architecture schools and which of them they follow on social networks (5) Demographic questions pertaining students' institution, department, grade and gender.

The link for reaching the questionnaire was sent to the students by e-mail. Students of architecture and interior design departments of three universities in Turkey were included in the research as the request was accepted by relevant department academics. Two of these Universities are located in Istanbul, while the third one is in Edirne. Duration of the survey was limited by 15 days. During this time period two separate e-mails with the questionnaire link was sent as a reminder to increase the participation.

The collected data were analyzed by using Microsoft Excel and SPSS software. Microsoft Excel was used for the descriptive analysis of the results, where SPSS was used for variance analysis between different groups of students. This paper reports only the descriptive data gathered by the questionnaire. Number of universities conducted and the limited time assigned for the answers were significant limitations of this research.

3   RESULTS

The questionnaire was sent to 1126 students of department of architecture and interior design in three different Universities in Turkey. At the end of the given time period, 240 valid questionnaire forms were received. The amount of valid answers corresponds to 21,3% of the total population. With these results, at a confidence level of 95% margin of error becomes 5,6%.

In this section, descriptive analysis of the survey data is reported according to the planned groups in this order: (1) Demographic questions pertaining students' institution, department, grade and gender. (2) Students' general perception and habitual approaches towards Internet and smartphone usage, social networks they actively use, awareness of weblogs, (3) Internet and Social network practices at the university and for their education (4) Their interest in architects, architectural offices and architecture schools and which of them they follow on social networks (5) General insights for using social media for architectural education.

3.1   Demographic data

Great majority of the students are form Istanbul Medipol University with 68%. Trakya University students are followed by Yeditepe University students with 19% and 14% respectively. Representing over two thirds of the total population, 68% of the respondents are female. About 65% of them are Architecture students compared 35% Interior Design students. Most of the students are at their first and second year at their University with 41% and 35% respectively. Third year students are represented with 14% and Fourth year students 6%. 3% of the students are studying in their department for more than four years.

3.2   General perceptions: Internet, smartphones, social networks

All the students answered the questionnaire are Internet users. Going online, 76% of students are using mobile phones, 21% are using notebook computers, 2% private desktop computers. Common desktop computer users and tablet computer users to connect Internet are smaller than 1%. Most of the students are spending between 2-6 hours going online with 51%. For about 30% of them this time extends to 6-12 hours. Going online more than 12 hours represent %10 and less than 2 hours %9. Percentage of students using mobile phones to go online is 97,5%, where the smartphone owners are

a noble 99,2%. More than 57% of these phones are using iOS, 42% Android and 0,42% "other" operating systems.

96,7% of the students state that they have active accounts in social networking sites. Instagram is the most popular social network with 93,5% followed by 76,8% Pinterest, 74,6% Facebook, 65,6% Twitter and 64,3% YouTube. Distribution of the social networking sites that students have accounts are shown on "Fig.1". Students have 4-6 social network accounts on average with 64,81%.
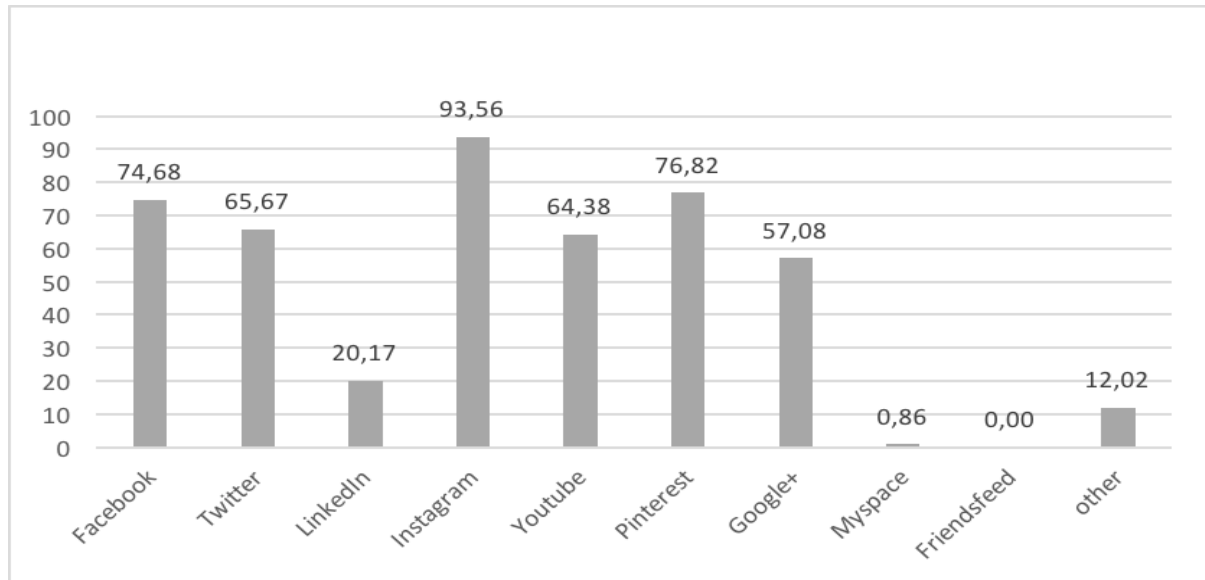

Figure 1. Percentage distribution of the students' social network accounts (%)

Students are also asked about their preference to use the social network accounts they use with a grade of 1-5, where 1 is the most preferred and the others follow up to the fifth preference. Instagram is the most preferred social network by 55,2%. Second one is YouTube by 20,5% and the third Facebook by 18,2%. Students' social network preferences are shown in "Fig.2".
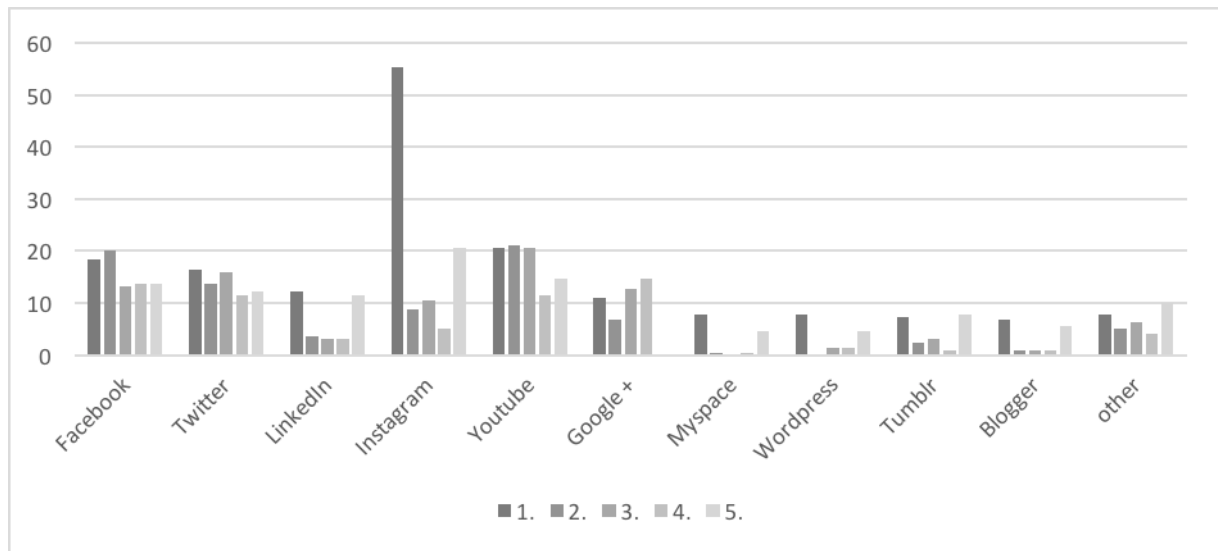

Figure 2. Students' social network preference-first to fifth choice (%)

More than two third of the students are checking their social media accounts many times daily with 71%. Students who are "online all the time" are 11%. When it comes to the time spent at social networks, it is slightly different from the time spent on internet. Again most of the students are spending between 2-6 hours in socials networks with 54%. About 17% of them spend 6-12 hours, 3% more than 12 hours and 26% less than 2 hours daily. 90% use their real names on social networks.

10,4% of the students have their personal weblog and 20,25% of the students visit weblog sites regularly. Between the weblog owners, 19% have more than one weblog and 42% of them send a post less than once a month, 11% once a month, 16% 2-3 times a month, 6% once a week, 17% 2-3 times a week. Meanwhile, 5% of the blog owners send 1 post, 3% more than 1 post a day. Regular visitors of the blog sites are asked about the weblog sites they visit and the blog owners about the weblog sites they own a blog. Answers show that Tumblr is both the most visited and most blog owned social network site between the ones that have interest. That one is followed by Blogger and WordPress.

3.3   Internet and social networks at the university

Students answers show that 78% of them both reach Internet and use that connection for reaching their social networks at the university. On the other hand most popular data package on mobile phones consist of 3-4 GB of internet connectivity. The other most popular packages are 5-6 GB by 19% and 1-2 GB by 17%. However, 13% of the students tell that they have a data package of more than 10GB. Only 10% of students admit that they never check their social network accounts during the classes. This percentage drops to 4% when they are asked if they go online during the classes. The answers for the same questions telling "occasionally I do" raise up to 41% and 58% respectively. During the classes, 10% is online all the time, and 6% is regularly checking social network accounts.

3.4   Friending, following and posting for Architecture

70% of the students follow architects or architectural offices from their social networks. Meanwhile Architectural schools are followed by 48,6%. Most popular network for following architects/architectural offices are Instagram by nearly 75%. On the other hand, architectural schools are being followed on Instagram with a percentage of 46%, Facebook 41% and Twitter 13%. Instant Messaging applications are also popular between students. 97% of them are using these apps. Between them WhatsApp is unapproachable with a usage of 100%. Then comes Snapchat with 61% and Facebook Messenger has a percentage of 35%. Skype has a share of 10%. Another outcome of instant messaging apps is the communication between student groups for lecture notes and even communication with lecturers. 90% of the students are regularly in instant messaging groups created for the lectures where 7% join occasionally.

Similarly, 40% of the lecturers of these classes do join these groups regularly where 46% join occasionally. 41% of the students also follow their academician's social networks joined by another 38%, who do the same occasionally. Students state that 46% of their design course's lecturers do regularly and 32% occasionally share course documents and information on social networks. When they are asked about posting course related online documents to the social networks, 30% of the students admit posting documents regularly and 39% admit occasionally. Meanwhile, 45% of the students assess their lecturers as efficient users of the social networks against 18% who oppose this idea. However, 37% of the students are neutral.

3.5   General insights for education

As the last question of the questionnaire, students were asked to indicate their thoughts about using social networks as a tool for their design education. About 52 students out of 240 have expressed their thoughts and ideas with a percentage of 21,6% in this open ended question. Initially, all the students who answered this question are affirmative and demanding from using social networks as an educational medium. Most of them are asking for a dynamic portal that will contain an archive of photos, videos, detail drawings, sample projects, presentations, book recommendations, articles, architectural terminology, interviews with famous architects and their work, enabling sharing and brain storming between students and lecturers. They request video tutorials and an archive about current lectures, announcements about architectural competition and apprenticeship opportunities. They want to freely express their design work. A few answers about blog usage were confusing as some of them were requesting for lecturer management while others were asking for independent, student led blogs. There is also a demand for the social networks to be introduced by lecturers and professionally managed faculty and department social media accounts behaving like social platforms between students and lecturers globally. Students are also asking for establishing mobile ready social networks and offer social responsibility projects for the community.

Besides, still being positive about the idea of using social media for education, some of the students are complaining about the fragmentation between different schools of architecture and their students,

closed or unclear jury and grading criteria. There are also complaints about class mate's social media idea manipulation such as copying an idea from Pinterest.

4   DISCUSSION AND CONCLUSIONS

Although the response rate below expectations compared the total population we have sent the questionnaire, 21,3% response rate and at a confidence level of 95%, 5,6% margin of error appeared acceptable for the initial part of the the research as a whole. There is a significant amount of female respondents with a percentage of 68%. This percentage is supporting the findings of the latest Pew Research Center's study putting forward the increasing number of females in social networks [7]. Students do not seem to have any difficulty for reaching the internet and their social media accounts both mobile and at their school. Smartphones have a significant dominance both for internet and social media usage. Number of Android and iOS devices are close to each other. Students tend to be online all the time. Instagram, Pinterest and Facebook are the top social networks but the percentage of Instagram with 93,5% is quiet significant. Again Pinterest as the second most popular social network with a percentage of 76,8% show the students' interest towards architectural project samples.

Instant messaging applications are widely used both for student groups and student lecturer communication. Student are following Weblog awareness and practice is below expectations and blog posting frequency is quiet low like the document sharing frequency by the students. However, Tumbler and Blogger are the most preferred weblogs followed by WordPress. Students are demanding for faculty/department owned and run social media platforms capable of storing course material and many extras.

Web 2.0 and smart phone technologies are changing the world we live in with an increasing pace. At the brink of a connected world with the 'internet of things', it seems things will get tougher to leave these devices and social networks out of the classroom. Although the idea of using such applications for the good of education is being discussed for some time now, research on using such tools and technologies for undergraduate architecture students is far from being extensive. This paper represents initial findings of a wider research trying to fill a fragment of this gap. Although a significant amount of architecture and interior design student have been involved in this part of the research more detailed enquiries should be made to go further in understanding and controlling the tools and technologies for educational purposes. In order to do this, net generation's point of view may be the key.

REFERENCES

[1]   S. Lancaster, D.C. Yen, A.H.Huang, S.Y.Hung, "The Selection Of Instant Messaging Or E-Mail: College Students' Perspective For Computer Communication," Information Management & Computer Security, Vol. 15, Issue 1, pp. 5-22, 2007

[2]   J. Gikas, M.M. Grant, "Mobile Computing Devices In Higher Education: Student Perspectives On Learning With Cellphones, Smartphones & Social Media," The Internet And Higher Education, Vol. 19, pp. 18-26, 2013

[3]   C. Baraniuk, "US Border Authority Seeks Travellers' Social Media Details," BBC, http://www.bbc.com/News/Technology-36650857.bbc

[4]   D.M. Boyd, N.B. Ellison, "Social Network Sites: Definition, History, And Scholarship," Journal Of Computer-Mediated Communication, Vol. 13, Issue 1, pp. 210-230. 2007.

[5]   Z.B.A. Vural, M. Bat, "Social Media As A New Communication Environment: A Research On Ege University Faculty Of Communication," Journal Of Yasar University, 2010.

[6]   L. Dawley, Social Network Knowledge Construction: Emerging Virtual World Pedagogy," On The Horizon, Vol. 17, Issue 12, 2009.

[7]   A. Perrin, " *Social Networking Usage: 2005-2015*," Pew Research Center, 2015.

[8]   M. Lister, "40 Essential Social Media Marketing Statistics For 2017," Wordstream, http://www.wordstream.Com/Blog/Ws/2017/01/05/Social-Media-Marketing-Statistics, 2017.

[9]   R. Hutt, "The World's Most Popular Social Networks, We Forum, Available From: https://www.weforum.org/Agenda/2017/03/Most-Popular-Social-Networks-Mapped/, 2017.

[10] F. Tiryakioglu, F. Erzurum, "Use Of Social Networks As An Education Tool," Contemporary Educational Technology, Vol. 2, Issue 2, pp 16, 2011.

[11] TUIK, "Hanehalki Bilisim Teknolojileri Kullanim Arastirmasi," 2016.

[12] A. Alter, "Irresistible: The Rise Of Addictive Technology And The Business Of Keeping Us Hooked," 2017.

[13] D. Greenfield, "The Addictive Properties Of Internet Usage In Internet Addiction: A Handbook And Guide To Evaluation And Treatment 2011," pp. 135-153.

[14] K.S. Young, "Internet Addiction: The Emergence Of A New Clinical Disorder," Cyberpsychology & Behavior, 2009.

[15] G. Ferraro, B. Caci, A. D'Amico, M. Di Blasi, "Internet Addiction Disorder: An Italian Study. Cyberpsychol Behav," Vol. 10, Issue 2, pp. 170-175, 2007.

[16] E. Dahlstrom, "ECAR Study Of Undergraduate Students And Information Technology," EDUCAUSE Center For Applied Research: Louisville, 2012.

[17] N. Friesen, S.L., "The Questionable Promise Of Social Media For Education: Connective Learning And The Commercial Imperativejcal," Journal Of Computer Assisted Learning, Vol. 28, pp. 183-194, 2012

[18] H.N. Kim, "The Phenomenon Of Blogs And Theoretical Model Of Blog Use In Educational Contexts," Computers & Education, Vol. 51, Issue 3, pp. 1342-1352, 2008.

[19] J. Pena-Shaff, W. Altman, H. Stephenson, "Asynchronous Online Discussions As A Tool For Learning: Students' Attitudes, Expectations, And Perceptions," Journal Of Interactive Learning Research, Vol. 16, Issue 4, 2005.

[20] M. Divitini, O. Haugalokken, E.M. Morken, "Blog To Support Learning In The Field: Lessons Learned From A Fiasco," 5th IEEE International Conference On Advanced Learning Technologies Proceedings, pp. 219-221, 2005.

[21] T. Page, "Application-Based Mobile Devices In Design Education," International Journal Of Mobile Learning And Organisation, Vol. 8, Issue 2, pp. 96-111, 2014.

[22] T. Georgiev, E. Georgieva, A. Smrikarov, "M-Learning - A New Stage Of E-Learning," International Conference On Computer Systems And Technologies, 2004.

[23] M. Eryilmaz, N. Simsek, "The Evaluation Of Students' Academic Achievements In Adaptive Environments," Education And Science, Vol. 39, Issue 173, pp 13, 2014.

[24] Y. Liu, "Social Media Tools As A Learning Resource," Journal Of Educational Technology Development And Exchange, Vol. 3, Issue 1, pp. 101-114, 2010.

[25] N.Tektas, "Research On University Students' Social Networking Habits," Journal Of History School (JOHS), Vol. 7, Issue 17, 2014.