A Study of Social Factors Associated with the Use of Information and Communication Technology: A Case Study of High School Female Students in Yazd

Fatemeh Teymouri [1], Masoud Hadjizadeh Meimandi [1, *] and Akbar Zare Shahabadi [1]

[1]Faculty of Social Sciences, Yazd University, yazd, Iran

*Corresponding author: Department of Social Sciences, Yazd University, P.O. Box: 89195741, University Blv., Safayieh, Yazd, Iran. Tel: +98-353532941, Email: mhadjizadeh@yazd.ac.ir

Abstract

Background: Use of modern communication technologies by teachers and students is an inventible strategy in educational centers. The aim of this study is to evaluate the social factors involved in using modern means of communication by female high school students in the city of Yazd, Iran.

Methods: The present research is a cross-sectional study conducted in 2015. As many as 365 girl students selected through a multiple-stage cluster sampling method took a researcher-made questionnaire that studied demographic characteristics and evaluated the extent of using modern communication technologies such as computer software programs, the Internet network, mobile phones, and social networks. The investigated social factors were age, family dimension, school type, family income, and parents' education.

Results: The findings showed that the use of modern communication technologies by students with mean 39.3 was lower than average, while computer software had a mean of 37.9, the Internet with a mean of 37.6, networks social media with a mean of 31.6, which was less than average, and mobile phone with a mean of 56 was higher average that, this difference is statistically significant(P < 0.001). Variables such as school type (P < 0.001), parents' education (P < 0.001), and family income (P = 0.04) had a significant correlation with the extent of using modern communication technologies (P < 0.05), while age and family dimension proved to have no correlation in this regard.

Conclusions: Use of modern communication technologies is associated with family income and parents' education. It means that an increase in parents' education and family income will lead to a higher level of skills in using these technologies. Educational policy makers should provide the poor segment of the society with an access to modern technologies. Attention to the risks of social networks is also recommended.

Keywords: Computer User Training, Educational Technology, Girl Students, Social Factors

1. Background

Modern technology is believed to be the main cause of social changes. It has, indeed, changed the nature and meaning of tasks and activities and created new material and cultural practices (1). From a technological deterministic point of view, society and technology are two distinct fields of consideration, and occurrence of changes is autonomous within the field of technology (2). The technology of communication has assumed many electronic forms (3). In recent years, computing and communication have undergone a revolution, and there is full evidence to suggest that advancement in information technology will continue at a fast pace (4).

Modern communication technologies bear several positive effects on societies. Creating global markets (4) and global businesses (5) is one of those effects. Reducing the frequency of errors (6) and improving quality and efficiency (7) and safety (8) are other functions. In education, it is now possible to have a virtual classroom where the instructor sits in a part of the world and communicates to his students scattered in different parts of the world through video conference by presenting the course materials and holding question and answer sessions (9). This technology has also had certain positive effects on other domains of modern societies such as library (10), management (11), and tourism (12).

In schools, the role of modern communication technologies has significantly increased. It has been shown that the constructive effect of computer technology is greater when combined with a constructivist approach

to teaching than with a traditional approach (13). More recently, new environments rich in technology have emerged in a good number of American classrooms where using technology was not a common practice (14). Due to its importance, many policy makers, executives, practitioners, and parents suggest that if schools are wired and enough hardware and software are put at their disposal, teachers and students will have a chance to abundantly use the technology for improvement of teaching and learning (15). Some believe that, if ICT is to be successfully implemented, some change needs to occur in three interlocked items, including the teacher, the school, and policy makers (16). However, it seems that students are ignored here.

Maintaining student engagement is proposed for teaching with technology (17). Bradley and Holley showed that 80% of students use the Internet, while 96% and 80% go to photography and video recording, respectively (18). It has been suggested that, to understand the pedagogical role of technology, an ecological perspective has to be adopted within a formidable analytical framework (19). Education has been found to be a significant predictor of IT access and use (20). Fairlie et al., believed that differences in income cannot fully explain the difference in computer ownership and internet use (21). It has been shown that a person's socioeconomic status affects his or her purpose in using the internet (22). However, inadequate access poses a major obstacle in the way of full exploitation of this technology (23). In Indonesia, the influences of peers and parents were found significant. In addition, the child's level of technical expertise and feelings of flow experience affected the use of social media by students (24). Warf believes that the high cost of broadband is often a cited reason for not having broadband access at home and may account for differences in broadband access across income groups (20).

2. Objectives

Despite the importance of students' position about using modern communication technologies, few studies have fully addressed the factors associated with the use of those technologies by students. This study tries to examine these factors. Thus, the research question is 'what are the main factors associated with the use of modern communication technologies by girl students?'

3. Methods

The present study is of a quantitative nature conducted through a survey technique. It is, indeed, a cross-sectional survey that deals with the matter in depth. The sample size of the study comprised of 365 female students selected

from 7,714, on the basis of Cochran sampling formula. The data collection was done through a multi-stage sampling method. In each stage of data collection, a probability method was used to obtain the corresponding probability proportional to size (method of sampling was probability proportional to size) (PPS) index.

The Public Education Organization of the city of Yazd is divided into districts 1 and 2. Out of 365 students participating in the study, 182 belonged to district 1 and 183 to district 2. They were selected through a 3-step cluster sampling method. At the first step, in each district, 10 schools were randomly selected and considered as the study society. At the second step, two classes were randomly chosen among those schools. At the third step, 9 students were picked randomly in each of those classes.

To elicit the data, at first, the girls' high schools in the city of Yazd were divided into two districts. This division was carefully done to ensure the full coverage of the city. Then, a group of respondents were chosen randomly from each area. The inclusion criterion was only the consent for participation in the study; all those who did not announce their consent for the study as well as those who were not aware of the research at the time of sampling were excluded. For this purpose, an informed consent was received from each participant, and ethical points were taken into account during the study.

The data of this study were collected by means of a questionnaire. To ensure the content validity as well as the face validity of the questionnaire, the researchers decided to make it themselves. For further validation, after the questionnaire was made, the researchers let it be shared by three experts, and their views were applied to it. The final vision of the questionnaire contained items about three main issues including demographic characteristics, modality, and the frequency of using modern means of communication. The demographic characteristics, considered as variables, included age, income, level of education at secondary school (i.e. first, second, or third grade), school type [i.e. state (or governmental), top, gifted (for highly talented pupils), or Shahed (for martyrs' children)], and the education level of their mother and father. The variable "The use of modern communication devices" was presented in 45 statements in the form of a 5-part Likert scale (i.e. very low, low, average, high, very high), in which the use of computer software programs with 7 items with a minimum score of 7 and a maximum of 35, mobile with 10 items with a minimum score 10 and the maximum of 50, the Internet with 7 items having a score of at least 7 and a maximum of 35, and social networks with 21 items with a score of at least 21 and a maximum of 105. As you can see, due to the difference in the number of items, the average use of these devices is not comparable, which is why

we have converted these variables from 0 to 100 by domain transformations method to allow comparisons of the use of each of these devices (Appendix 1 in Supplementary File). The order of the score of 50 was considered as a moderate criterion, so the average below 50 was lower than the average and higher than the average was described. The questionnaire reliability calculated on the basis of Cronbach's alpha was found to be 0.896 for the variable "frequency of using information and communications technology" and 0.726 for the variable of legality.

The data were analyzed by SPSS 22 software. One-sample test and ANOVA and Fridman statistical tests were used. The level of significance was considered to be $P < 0.05$.

4. Results

According to the descriptive results, the youngest respondent was 14 and the oldest one was 19 years old. The respondents' average age was 16.7 years (SD = 0.79). In terms of the educational status of their parents, 13.9% of the fathers were illiterate or just had an elementary school degree, 21.2% had a lower secondary school diploma, 33% had a high school diploma, and 31.8% had an academic degree. Therefore, the highest frequency belonged to those whose fathers had high school diplomas and academic degrees. As for the mothers, it was shown that 19.8% of them were illiterate or just had elementary school education, 20.1% had a lower secondary school diploma, 35.6% had a high school diploma, and 24.6% had an academic degree. With regard to the variable of grade point average (GPA), the lowest grade of the respondents was 13.5 and the highest was 20. Thus, the respondents' average GPA was 18.3. As it was observed, 73.5% of the respondents were studying in state schools, 18% in top schools, 2.4% in gifted schools, 6.2% in Shahed schools, and 0.9% in affiliated schools. Of these school types, the state schools had the best contribution. In terms of dimension, the families had a maximum population of 6 to 11 members.

In relation to beneficial rate of using technologies, the lowest and the highest scores were 45 and 196, respectively, with the average of 115.81. The examination showed that each of these technologies was used to a certain extent except mobile phones. As it was found, computer software, Internet networks, and social networks were used below an average level, with the scores 39.3, 37.9, and 31.6, respectively. The score on the use of mobile phones was 56, which was above the statistical average (mean) at a significant level. Also, in the Friedman test, according to the Chi-Square statistic with d.f 3 and the significant level ($P < 0.001$), the same assumption in that the use of technology

is rejected by student. That is, the amount of different technologies used varies between students and, accordingly, mobile is the most used and social networks are the least used (Table 2).

The results of the illative examination showed no relationship between family dimension, age, and average of students on one hand and the use of modern communication technologies on the other. However, there was a relationship with other variables. The analysis of variance showed that the rate of using technology varies based on the school type; the total average of technology use in governmental, featured, Sampad and Shahed schools was 37/4, 45/2, 57/6, and 41/8, respectively. This proves that, in general, Sampad students were highly dependent on technology as compared to those studying in governmental schools who had the least accessibility. These differences are significant at a level lower than ($P < 0.001$).

Based on the results obtained from the ANOVA test, parents' education had a significant positive correlation with the use of modern communication technologies. In other words, as the education level of the father and mother rose, the use of modern communication technologies would increase). These differences were significant at a level below 0.05 (Father's education $P < 0.001$), (Mothers' education $P = 0.003$).

The analysis of variance showed that the amount of technology use varied based on income. The total average use of technology at an income level under one million Tomans or lower than that was 32/2, 39/5 for the income level of two million, and 42/6 for an income level higher than two million. In other words, the students whose income was more than two million had the highest rate of technology use, while the students with an income of one million or less used the technology at the lowest rate. These differences were significant ($P = 0.04$).

5. Discussion

From the results of this research, it is understood that the rate of using modern communication technologies by students is below the mean. It is also found that the use of these technologies is various depending on the school type; the students of Sampad schools benefit the most while the ones in governmental schools use those technologies the least. Students get impressed in the environment based on the school type and by others who are at the same age. This factor has a significant role in their use of technologies. The rather extensive use of communication technologies by the students in Sampad schools may be attributed to the nature of education in those schools. There is a quite positive correlation between the parents'

Table 1. Demographic Features of the Participants[a]

Variables	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Level of lower secondary school education				
First grade	14	3.9	5.4	5.4
Second grade	86	24.2	33.2	38.6
Third grade	159	44.7	61.4	100.0
Missing value	106	27.2	-	-
Type of school				
State	249	69.9	73.5	-
Top	61	17.1	18.0	-
Gifted	8	2.2	2.4	-
Shahed	21	5.9	6.2	-
Missing value	26	10.8	-	-
Father's education				
Illiterate or elementary	46	12.9	13.9	13.9
Lower secondary school diploma	70	19.7	21.2	35.2
High school diploma	109	30.6	33.0	68.2
Academic	105	29.5	31.8	100.0
Missing value	35	9.5	-	-
Mother's education				
Illiterate or elementary	65	18.3	19.8	19.8
Lower secondary school diploma	66	18.5	20.1	39.8
Diploma	117	32.9	35.6	75.4
Academic degree	81	22.8	24.6	100.0
Missing value	36	9.8	-	-

[a] Using this formula the scale scores will be forced between 0 and the number indicated by n. (25).

Table 2. Determination the Level of Using Information and Communication Technologies[a]

Variable	N	Mean $\pm$ SD	Median (IQR)[**]	t[*]	P-Value
Computer software	340	37.9 $\pm$ 18.2	39.28	12.2	< 0.001
Internet network	337	37.6 $\pm$ 22.2	39.28	10.2	< 0.001
Mobile phone	342	56 $\pm$ 17.99	57.5	6.1	< 0.001
Social networks	312	31.7 $\pm$ 19.8	32.14	16.3	< 0.001
Total	284	115.81 $\pm$ 28.3	-	11.4	< 0.001
P-value	-	-	< 0.001	-	-

[a] [*] One-sample T- test, [**] tests of between-subjects effects (Friedman test).

education level and the students' use of modern communication technologies; the more educated the parents are, the more the students use modern communication technologies. This is in line with another study that identified five components of parental influence including parental ICT skills, parental monitoring, parental control, parental guidance, and parental worries (26). In this regard, it seems that parents' level of literacy affects their skills and orientations, which leads to their children's use of communication technologies. Also, as Warf's research has shown, education is a strong predictor in the use of communication technologies due to the fact that it seems that education enhances students' technical skills. This is in agreement with an Indonesian research that has shown the in-

Table 3. Analysis of Variance Test Amount of Technology Use According to School Type and Income[a,b]

Parameter Type	Computer Software	Internet Networks	Mobile Phone	Social Networks	Total
School type					
Govermental school	46.7 ± 12.47	36.2 ± 23.00	60.3 ± 17.28	30.5 ± 18.7	41.8 ± 14.8
Specific school	53.5 ± 22.92	39.7 ± 26.83	61.07 ± 22.67	57.6 ± 21.38	57.6 ± 17.4
Sampad school	38.8 ± 15.01	50.4 ± 19.6	59.9 ± 13.73	37.2 ± 14.67	45.2 ± 11.7
F[*]	3.8	8.7	1.9	7.09	7.3
P-value	0.009[*]	0.000[**]	0.12	0.000[**]	0.000[**]
Income					
More than two millions	40.6 ± 16.40	39.4 ± 20.09	59.9 ± 16.82	49.2 ± 16.28	42.6 ± 15.61
One to two million Tomans	39.1 ± 16.19	39.3 ± 20.94	55.8 ± 16.7	47.5 ± 14.56	39.5 ± 21.41
Below one million Tomans	35.0 ± 17.55	35.3 ± 29.39	49.1 ± 19.23	42.5 ± 20.47	32.2 ± 16.35
F[*]	0.79	0.29	3.1	1.07	3.06
P-value	0.4	0.7	0.07	0.3	0.04[*]

[a] [*] Association is significant at the level of < 0.05, [**] P < 0.001.
[b] Values are presented mean ± SD.

fluences of peers and parents on the child's level of technical expertise and his or her use of social media (24).

Based on the research findings, the mount of students' access is various and depends on their family income; the higher the family income is, the more the use of modern communication technologies will be. Students living in families with an income under one million Tomans have the lowest rate of using these technologies and acquire financial capability to define this relation. In this regard, Kilic and Güzeller (22) showed that the use of the virtual world as well as the aim of using it is dependent on financial factors. Fairlie et al. believed that differences in income only partially account for the difference in computer ownership and Internet use (21). Warf believed that the high cost of broadband is a commonly cited reason for not having broadband access at home and may account for differences in broadband access across income groups (20).

The research results showed social and financial factors are of intertwined effects that should be noted along with the risk of these technologies, specifically social networks. As a matter of fact, the technologies pose certain threats to modern societies, especially the youth. Among modern technologies, social media has crucial roles. This is due to the fact that the borderlines between the virtual and real worlds are increasingly blurred for the youth today (26). Potential problems such as cyber bullying, Facebook depression, sexting, and exposure to inappropriate contents are the main hazards of social media that need to be paid attention to (27). With respect to the fact that students make up the future of the country, they should to be trained on how to use modern communication technolo-

gies. The trainings may be given by providing instructions and tactics and pursuing them to make them part of the students' culture at school and home.

In general, what can be concluded is that students' use of modern communication technologies is under the influence of social and financial factors, calling for the serious attention of policy makers to students coming from poor families. On the other hand, due to non-wholesome use of those communication facilities, there are hidden threats posed to teenagers, which have to be taken into account when making policies.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments

References

1. Wajcman J. Life in the fast lane? Towards a sociology of technology and time. *Br J Sociol*. 2008;**59**(1):59–77. doi: 10.1111/j.1468-4446.2007.00182.x. [PubMed: 18321331].

2. Yousefikhah S. Sociology of innovation: Social construction of technology perspective. *AD-Minister*. 2017;(30):31–43.

3. Watt HJ. How does the use of modern communication technology influence language and literacy development? A review. *Cont Iss Communic Sci Disorder*. 2010;**37**:141.

4. Lee KR. *Impacts of information technology on society in the new century*. **27**. Switzerland: Konsbruck Robert Lee Route de Chavannes C; 2002.

5. Ives B, Jarvenpaa SL, Mason RO. Global business drivers: Aligning information technology to global business strategy. *IBM Sys J*. 1993;**32**(1):143–61. doi: 10.1147/sj.321.0143.

6. Bates DW, Cohen M, Leape LL, Overhage JM, Shabot MM, Sheridan T. Reducing the frequency of errors in medicine using information technology. *J Am Med Inform Assoc*. 2001;**8**(4):299–308. [PubMed: 11418536]. [PubMed Central: PMC130074].

7. Chaudhry B, Wang J, Wu S, Maglione M, Mojica W, Roth E, et al. Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. *Ann Intern Med*. 2006;**144**(10):742–52. [PubMed: 16702590].

8. Bates DW, Gawande AA. Improving safety with information technology. *N Engl J Med*. 2003;**348**(25):2526–34. doi: 10.1056/NEJMsa020847. [PubMed: 12815139].

9. Deb S. Information technology, its impact on society and its future. *Adv Comput*. 2014;**4**(1):25–9. doi: 10.5923/j.ac.20140401.07.

10. Kopp JJ. Library consortia and information technology: the past, the present, the promise. *Inform Technol Libr*. 1998;**17**(1):7.

11. Schwalbe K. *Information technology project management*. 8th ed. Cengage Learning; 2015.

12. Buhalis D, Law R. Progress in information technology and tourism management: 20 years on and 10 years after the Internet, the state of eTourism research. *Tourism Manage*. 2008;**29**(4):609–23. doi: 10.1016/j.tourman.2008.01.005.

13. Li Q, Ma X. A meta-analysis of the effects of computer technology on school students' mathematics learning. *Educ Psychol Rev*. 2010;**22**(3):215–43. doi: 10.1007/s10648-010-9125-8.

14. Bebell D. *Technology promoting student excellence: An investigation of the first year of 1: 1 computing in New Hampshire middle schools*. **26**. Boston: Technology and Assessment Study Collaborative, Boston College; 2005.

15. Cuban L, Kirkpatrick H, Peck C. High access and low use of technologies in high school classrooms: explaining an apparent paradox. *Am Educ Res J*. 2016;**38**(4):813–34. doi: 10.3102/00028312038004813.

16. Mumtaz S. Factors affecting teachers' use of information and communications technology: a review of the literature. *J Inform Technol Teach Educ*. 2006;**9**(3):319–42. doi: 10.1080/14759390000200096.

17. Sandholtz JH, Ringstaff C, Dwyer DC. *Teaching with technology: creating student-centered classrooms*. illustrated ed. Teachers College Press; 1997.

18. Bradley C, Holley D. How students in Higher Education use their mobile phones for learning. *Int J Mob Blend Learn*. 2010;**3**(4):38–53. doi: 10.4018/jmbl.2011100103.

19. Zhao Y, Frank KA. Factors affecting technology uses in schools: an ecological perspective. *Am Educ Res J*. 2016;**40**(4):807–40. doi: 10.3102/00028312040004807.

20. Warf B. Contemporary digital divides in the United States. *Tijdschr Econ Soc Ge*. 2013;**104**(1):1–17. doi: 10.1111/j.1467-9663.2012.00720.x.

21. Fairlie RW, London R, Rosner R, Pastor M. *Crossing the divide: Immigrant youth and digital disparity in California: center for justice, tolerance, and community*. Santa Cruz: University of California; 2006.

22. Kilic AF, Güzeller CO. Demographic factors affecting internet using purposes of high school students. *Malays Online J Educ Technol*. 2017;**5**(1):34–45.

23. Olatokun WM. Internet access and usage by secondary school students in a Nigerian municipality. *S Afr J Librar Inform Sci*. 2008;**74**(2):138–48.

24. Kristianto B. Factors affecting social network use by students in Indonesia. *J Inform Technol Educ Res*. 2017;**16**:69–103. doi: 10.28945/3675.

25. Vaus D. *Surveys in social research*. illustrated, reprint, revised ed. London: Taylor and Francis; 2002.

26. Yu M, Yuen AHK, Park J. Students' computer use at home: a study on family environment and parental influence. *Res Practice Technol Enhanc Learn*. 2012;**7**(1).

27. Subrahmanyam K, Greenfield P. Online communication and adolescent relationships. *Future Child*. 2008;**18**(1):119–46. [PubMed: 21338008].