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Research Article

Online Education Skills of Teachers: Four Axes of Gaps

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Abstract

There is a diversity in the teachers' digital capabilities of online education skills and many research related this for decades. According to the literature review teachers were being discriminated based on numerous gaps. This paper seeks to assess the existence of gaps of teachers' online education skills in the four axes: access, age, gender, and language. A research was carried out through an online questionnaire and the results of technology-based online education skills; web-based online education skills, and administrative online education skills were analysed statistically. There was a significant digital convergence among the teachers surveyed, which is important for their ability to deliver effective online courses. To bridge these gaps in the educational world of teachers, in-service training plans should be made, collaboratively with the online education experts and technology experts. This research study has some significant results compared to the studies delivered in the last decade.

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Introduction

Online education become a subject of educational experts since the invention of the biggest network Internet. Day by day, the importance, the effectiveness and the easiness in e-tools become clearer and the need for the teachers having the necessary e-teaching ability and skills increases. Online education can be synchronous, asynchronous or blended. There are many studies in the literature compare blended and asynchronous distance education (Tuncay, 2010; Yalman & Kutluca, 2013) and many who more concerned the quality of the education other than the type of the education (Kayak & Kır, 2015; Youssef & Ragni, 2008). We know that the success of an Online Education associated with the following words in one way or another: *wants, capabilities, necessities, lacks, gaps, expectations, motivations, deficiencies, requirements, prerequisites, qualifications and essentials*.

Gaps in Online Education

Educational research is very important for both developed and developing countries and societies, and it is the basis for development in all educational fields, as it keeps educational institutions away from arbitrary actions that may happen to be right in some cases but wrong in others (Elsayed & Abdelkader, 2019). The more that we research the more that we find Gaps in Online Education and the more that we work for finding solutions to it. There are lots of information about gaps between teachers, students, online course designers in the literature and many researchers seek ways to narrow these gaps in the Online education for years (Arslan, Kutluca & Özpınar, 2011; Brown, 2016; Çoban, 2020; Gunga & Ricketts, 2007; Uzunboylu &Tuncay, 2010).

Its known that there are gaps in Online Education for decades in terms of teachers online teaching skills, in terms of students' online learning capacities, in terms of online technical availabilities and opportunities. With respect to these factors, earlier studies (Ahmed, 2007; Bhanji, 2008; Clarke et al, 2008) cited that the most-accepted gaps are Internet gaps, age gaps, digital gaps, knowledge gaps, access gaps, economic gaps, and performance gaps. Also, Hargittai (2003), Piskurich (2003), Papastergiou & Solomonidou (2005) and Uzunboylu &Tuncay(2010) studied the existence of access gaps and discussed being able to access Online Course Sources. Besides of all the gap researchers and the existent problems in Online Education, many researchers found using different approaches toward teaching and learning, both pedagogical and organizational can help achieve positive outcomes and narrow the gap (Uzunboylu &Tuncay, 2010).

Online Education Skills of Teachers

Literature consist lots of findings where teachers try to improve their own training needs. Most respondents use informal means of professional development to improve e-learning expertise and most of them rate current programs poor or fair (European Centre for Development of Vocational Training, 2001; survey with 446 participants). What Similarly, Uzunboylu and Sor (2008) found the primary school teachers had e-learning training needs and had gaps between their peers. As a result of the findings of pre-service teachers graduate from teacher education programs without having enough digital competence skills,

teacher training programs started (Durak, Saritepeci & Çakır, 2016; Gill, Dalgarno, & Carlson, 2015; Gudmundsdottir & Hatlevik, 2018).

Digital competence training, pre-service teachers have improved in using information searching strategies, accessing information, evaluating the validity and reliability of information, organizing and storing information (Çebi & Reisoğlu, 2019). Digital competence trainings improved preservice teachers' skills of searching for information on the web (Ramírez-Montoya, Mena, & Rodríguez-Arroyo, 2017). The purpose of this study is to find out if there is any gap of teachers between their Online Education skills. We are residing in a planet where technology is contemporary in our life routines. Online Learning is one of the vastest revolutions in individuals' lifespans. They give mobility and excitement to its users that these modern technological devices become most significant part of many people's lives. From online banking to watch the news on TV, we are confronting the progressions and affects that convey to our lives. Schools couldn't stay out of these online progressions and a wide range of classrooms had been altered, giving its place to virtual classrooms, from special spaces for the perusing of scholarly messages being delivered via social media platforms to sight and sound spaces, where the utilization of data and correspondence innovation had accomplished incredible significance in Online learning.

Purpose of the Study

The purpose of this study is to find out if there is any gap of teachers between their web-based online education skills, technology-based education skills and administrative-based online education skills in the four axes: Access, Age, Gender and Language.

Method

Problem and Research Pattern

Teachers having online education skills is essential for an effective online course. What is more, their skills may differ on the technology based, web-based and administrative based issues. There may also be access difference, age difference, gender difference and language difference among online education skills.

Some offline application as well as online learning applications white boards has found to have positive effects both on learning and quality of teaching and there are some researchers who claim Project-Web Learning Approach may be very effective in online

education (Elsayed & Abdelkader, 2019). Not only the usability but its applicability and effectiveness has been subject of many research papers for years and it will still continue to be one of the most popular subjects in the education, especially after the Covid-19 Pandemic days.

In this research scan pattern from the quantitative research methods and literature review was used. Frankel, Wallen & Hyun, (2012) identified the scan pattern as the research which are practiced on all population or a group of samples which were taken from the population, with the aim of making generalizations for the population in the selected samples which have so many similarities.

Population

500 questionnaires (250 online and 250 paper) were distributed; there was a remarkably high response rate to the questionnaires (%98), and 490 response was gained. The population of the research consists of all the 490 (246 female and 244 Male) teachers from 12 different schools in North Cyprus.

Instrument

The questionnaire which was developed for finding E-Learning Training Needs of Teachers by Tuncay and Uzunboylu (2010) is improved and is rewritten to examine the Online Education skills of teachers. For the adopted questionnaire, to evaluate the items in the questionnaire, online expert's evaluation (n = 5) was wanted. Experts group from online education technologist evaluated the data gathering scale both individually and collaboratively. Under the suggestions of the online education experts, necessary corrections were done to the draft form of the questionnaire. Hence, the content validity was maintained by the help of the experts and necessary corrections was made to the questionnaire. The total questionnaire was composed of 32 items, where teachers were asked to choose the suitable scales for themselves, in each item of the questionnaire. The scales were arranged as: Needs to be improved, basic, good, very good and excellent. After having taken the experts suggestions; the questionnaire was divided into 3 factors: Technology based online education skills (r=0.97), web- based online education skills (r=0.97), and administrative online education skills (r=0.97) similarly to the questionnaire of Tuncay and Uzunboylu (2010), this questionnaire is found to have even higher correlation coefficients: "How would

you describe your skill of preparing slide shows by using multimedia presentation software (ex. Microsoft PowerPoint) via your Smartphones/Laptops?"; "How would you describe your skill of joining to the online discussion groups?"; "How would you describe your skill of using e-course management systems?"; "How would you describe your ability of joining to the online tutorials?".

Process of Data Collection

Process of data collection took place between February 2019 and April 2019. It was in 2-fold: 1. Schools were visited, and paper questionnaires were distributed. 2. Online questionnaires were distributed to teachers from their Social Media accounts, mostly from Messenger and WhatsApp. Distribution of paper questionnaires was not an easy job; lots of travelling and explanation was needed and reminding calls were necessary, some schools were visited 3 times: one for distributing questionnaires and others were for collecting them. Messenger and WhatsApp messages were easier, but they also had their challenges like messages were sent to the teachers in the friendship. People at social media network was also helpful sharing the messages by sending them to teacher groups. Teachers were also reminding each other to fill the questionnaire. Feedback about the meanings of the questionnaire items and confirmation about their personal data will not be used was given when needed. Teachers mark their own skills or knowledge as excellent, very good, good, basic and needs to be improved.

Data Analysis

Descriptive statistics, frequencies and graphics were used to analyse and to report the data gained from the questionnaire. For data analysis, IBM SPSS Statistics 25 was used. The mean values of the online questionnaire item scores are interpreted as: Values from 1.00 to 2.99 reveals that there is "*online education training need"* and the values from 3.00 to 5.00 reveals that there is "*online education training is not need*". The mean and standard deviation of the questionnaire items, which were arranged in three factors, was found by IBM SPSS Statistics 25 and the subjects which *online education training* should be delivered and the subjects in whom delivering *online education training* was not necessary are listed. In this paper, the questionnaire items are arranged according to the online facilities required: usage and preparation. Usage facilities are the online education facilities that

require skills/knowledge of using an e-learning tools (for example, usage of some physical tools like Headphones and usage of Clouding system). The preparation facilities are the facilities maintains, in whom teacher's preparation of online education tool themselves (for example, preparation of a web-based online course).

Technology-based online education skills questionnaire items consist of usage of the vocational e-learning equipment's, preparation of vocational presentations using various, e-course materials, usage USB (Universal Serial Bus) memory, preparation of course materials by using a word processor, preparation of course materials by using a spreadsheet, preparation of course materials by using a multimedia presentation software, preparation of an live video-conference, effective usage of an operating system, recording a distant course, usage of e-books and usage of smart educational tools (ex. Screen Recorder, Screen Clipping). Web-based online education skills; usage of E-TV, usage of E-Radio, surfing through Internet, receiving and sending e-mail, joining to online discussion groups, online video conferencing, joining to online tutorials, buying educational equipment over internet, sharing resources from a network, preparation of a web-based course, delivering synchronous, asynchronous or blended, e-learning courses, joining to vocational e-certificate programs, preparation of e-exercises, consulting e-help. Administrative online education skills consist of selection and preparation of vocational, e-course materials, preparation of collaborative e-courses, arrangement of an e-meeting, managing multiple e-learning activities at a time, usage of course management systems, usage of school management systems and usage of e-software tools for preparing online e-quizzes (ex. Google Tests).

Findings and Discussion

The results and discussions will be explained in five sub-sections. In the first section, descriptive studies of questionnaire items will be given, Access Difference among Online Education Skills, Age Difference among Online Education Skills, Gender Difference among Online Education Skills and Language Difference among Online Education Skills.

Descriptive Statistics of Questionnaire Items

Table 1 contains Descriptive statistics of Questionnaire Items: Technology-based online education skills items, Web-based online education skills items and Administrative online education skills items. Values from 1.00 to 2.99 reveals that there is "*online education*

training need" and the values from 3.00 to 5.00 reveals that there is "*online education training is not need*".

"*Preparation of online presentations"* (M=2.84, SD=0.56), "*Preparation of online course materials by using a spreadsheet"* (M=2.00, SD=0.85), "*Preparation of online course materials by using presentation software"* (M=2.84, SD=0.56) and "*Preparation of online presentations*" (M=2.84, SD=0.56) and "*Usage of online tools*" (M=2.84, SD=0.56).

The only Online Education Training need from Web-based online education skills is "*Joining to online-certificate programs*" (M=1.95, SD=1.21). It was interesting to find out that teachers do not have Online Education Training Needs in most of the Technology-based Online Educational Skills except "Preparation of online-exercises" (M= 1.95, SD=1.21) and "Usage of Online Tools" (M= 2.84, SD=0.56).

In the research study delivered by with respect to these factors, earlier studies (Acar, 2020; Ahmed, 2007; Anderson, et.al, 2007; Bhanji, 2008; Clarke et al, 2008; Uzunboylu & Tuncay 2010; Gregory, et.al, 2010; Goldhaber, et. al, 2019,). Teachers are the key personnel in the integration of computers in instructional situations and in the adoption of all other innovations in schools (Uzunboylu &Tuncay, 2010). Uzunboylu & Tuncay (2010) found a significant digital divergence observed among the teachers surveyed, which would adversely affect their ability to prepare students for the knowledge society.

Table 1. Descriptive statistics of questionnaire items

Item Number		*Measured Subject*	Mean	Standard Deviation
1	Technology-based online education skills	Usage of online learning devices	3.16	0.60
4		Preparation of online presentations	2.84	0.56
5		Usage of a e-tools like USB memory	3.82	0.62
6		Preparation of online course materials by using e-learning tools	3.07	0.56
7		Preparation of online course materials by using a spreadsheet	2.00	0.85
8		Preparation of online course materials by using a multimedia presentation software	2.84	0.56
9		Recording a Videoconference	2.84	0.56
10		Usage of an operating system	3.84	0.61
18		Preparation of an online course	2.00	0.85

23		Usage of online tools	2.84	0.56
32		Usage of Learning Management Systems	3.27	0.75
2		Usage of E-TV	3.16	0.60
3		Usage of E-Radio	3.05	0.69
11		Surfing through Internet	3.07	0.56
12		Receiving and sending e-mail	3.16	0.60
13		Joining to online discussion groups	3.07	0.56
14	Web-based	Online video conferencing	3.35	0.76
15	online	Joining to online tutorials	3.85	0.68
16	education	Buying educational equipment over internet	3.82	0.62
17	skills	Sharing resources from a network	3.84	0.70
19		Preparation of a web-based course	3.35	0.76
20		Delivering synchronous, asynchronous, or blended e-learning courses	3.16	0.60
25		Joining to online-certificate programs	3.12	0.85
26		Preparation of online exercises	1.95	1.21
27		Consulting Online-help	3.86	0.67
21		Selection and preparation of online-course materials	2.53	0.76
22		Preparation of collaborative online-courses	2.34	0.64
24	Administra	Arrangement of a videoconference	2.62	0.52
28	tive online education	Managing multiple online-learning activities at a time	2.84	0.56
29	skills	Usage of online course management systems	2.00	0.85
30		Usage of school management systems	3.16	0.60
31		Usage of e-software tools for preparing online e-quizzes.	1.94	0.53

Usage of school management systems (M= 2.00, SD=0.85) and Usage of e-software tools for preparing online e-quizzes (M= 1.94, SD=0.53) are administrative-based online learning education skills of teachers online training needs.

Access Difference among Online Education Skills

Differences of the statistics between teachers who have limited access (n=269) and unlimited access (n=221) to sources affects their Web-Based and Technology-Based and Administrative-Based skills. Limited Web-Based Skills (M=3.56) were higher than unlimited Web-Based Skills (M=3.52); Limited Technological-Based Skills (M=2.54) were higher than unlimited Technological-Based Skills (M=2.52); Limited Administrative-Based Skills (M=2.55) were higher than unlimited Administrative-Based Skills (M=2.56). However

Independent t-test results show that this difference is not statistically meaningful. There is not any Access Gaps between Online Education Skills of Teachers. This result is contradicting with the research study delivered by Uzunboylu and Tuncay (2010), in 2009, a decade before.

Table 2. Differences between limited and unlimited skills

Access		*N*	*Mean*	*Std. Deviation*	*Std. Error Mean*
Web-Based	Limited	269	3.56	0.50	0.03
	Unlimited	221	3.52	0.50	0.03
Technology-Based	Limited	269	2.54	0.50	0.03
	Unlimited	221	2.52	0.50	0.03
Administrative-Based	Limited	269	2.55	0.50	0.03
	Unlimited	221	2.56	0.50	0.03

These statistics shows that the limited and unlimited access does not make an important difference in teachers' web-based, technology based and administrative based skills. Teachers who want to learn, like students can find a way to learn things. Difficulties does not make things impossible in education. Always there is a way to achieving goals when there is enough motivation for it. There is not any Age Gaps between Online Education Skills of Teachers. This result is also contradicting with the research study delivered by Uzunboylu and Tuncay (2010), in 2009, a decade before.

Age Difference among Online Education Skills

Web-based, Technology-based, and Administrative-based skills of Teachers above 30 and below 30 are shown in the Table 4. We can see in the Table 3 that teachers do not have Web-based training needs, it may be because of the widespread of Smartphone technology and Internet, teachers are used to using Web-based tools (M>2.99). On the other hand, we can see that Technology-based and Administrative-based skills of teachers below 30 and above 30 (M<2.99).

Table 3. Online education skills and age

Age		N	Mean	Std. Deviation	Std. Error Mean
Web-Based	Below 30	248	3.57	0.50	0.03
	Above 30	242	3.52	0.50	0.03
Technology-Based	Below 30	248	2.56	0.50	0.03
	Above 30	242	2.51	0.50	0.03
Administrative-Based	Below 30	248	2.58	0.49	0.03
	Above 30	242	2.53	0.50	0.03

There were 242 teachers who were below 248 and Table 4 shows that the online education skills of teachers. Although there were differences between two groups, statistical analysis of Independent t-test shows that results for older (above 30) and younger (below 30) teacher groups shows that there were not significant differences between their web based, technology based, administrative based online education skills. There is not Age gap between Online Education Skills of Teachers. This result is also contradicting with the research study delivered by Uzunboylu and Tuncay (2010), in 2009, a decade before.

Gender Difference among Online Education Skills

The means of the female (n=246) and male(n=244) Web-based, technology based, and administrative based skills are shown in Table 4. Values from 1.00 to 2.99 reveals that there is "*online education training need"* and the values from 3.00 to 5.00 reveals that there is "*online education training is not need*".

Table 4. Gender difference among online education skills

Gender		*N*	*Mean*	SD	*Std. Error Mean*
Web-Based	Female	246	3.52	0.50	0.03
	Male	244	3.57	0.50	0.03
Technology-Based	Female	246	2.51	0.50	0.03
	Male	244	2.56	0.50	0.03
Administrative-Based	Female	246	2.47	0.50	0.03
	Male	244	2.64	0.50	0.03

According to Table 4 and Table 5, the descriptive statistics and the Independent t-test between female teachers (M=2.47, S.D.=0.5) and male teachers (M=2.64, S.D.=0.5) shows that there is a significant difference between "Administrative Based" Skills of teachers and males were more confident with their skills. This result is similar to the research study delivered by Uzunboylu and Tuncay (2010), in 2009, a decade before.

Table 5. Independent t-test gender difference

	t	df	Sig. (2-tailed)
Web-Based	-1.00	488	0.32
Technology-Based	-1.18	488	0.24
Administrative-Based	3.76	488	0.00

Language Differences among Online Education Skills

There were 249 Bilingual Teachers and 241 Monolingual Teachers who have attained to this research study. Web based application skills of Bilingual teachers (N=249, M=3.51) were lower than Monolingual teachers (N=241, M=3.58); Technology based application skills of Bilingual teachers (N=249, M=2.50) were lower than Technology based application skills of Monolingual teachers (N=241, M=2.57) and Administrative based application skills of Bilingual Teachers (N=249, M=2.48) were lower than Monolingual teachers Administrative based application skills (N=241, M=2.63).

Table 6. Difference of highs school and monolingual teachers

Teachers		N	Mean	Std. Deviation	Std. Error Mean
Web-Based	Bilingual Teacher	249	3.51	0.50	0.03
	Monolingual Teacher	241	3.58	0.50	0.03
Technology-Based	Bilingual Teacher	249	2.50	0.50	0.03
	Monolingual Teacher	241	2.57	0.50	0.03
Administrative-Based	Bilingual Teacher	249	2.48	0.50	0.03
	Monolingual Teacher	241	2.63	0.49	0.03

Table 6 shows there were not significant differences between Web Based and Technology Based Online education needs. However, there were significant differences

between Bilingual teachers and Monolingual teachers Administrative based learning skills. Table 6 shows technology Web Based Administrative Online Education Skills of teachers.

Table 7. Independent t-test results of bilingual and monolingual teachers

	t	Df	Sig. (2-tailed)
Web-Based	-1.48	488	0.14
Technology-Based	-1.66	488	0.1
Administrative-Based	3.26	488	0.01

Discussion, Conclusion and Recommendation

The aim of this study was to find Online Education Skills of teachers in the four axes: Access, Age, Gender and Language. Key point of online education is teachers; the more skilled that the teachers are the more successful are the distance educations. Teachers have evaluated their own skills in the online questionnaire and values from 1.00 to 2.99 interpreted as there is "*online education training need"* and the values from 3.00 to 5.00 interpreted that there is "*online education training is not need*". There is not any Age Gaps, Access Gaps between Online Education Skills of Teachers. There were not significant differences between their web based, technology based, administrative based online education skills of teachers. This result is also contradicting with the research study delivered by Uzunboylu and Tuncay (2010), in 2009, a decade before. However, there were significant differences between Bilingual teachers and Monolingual teachers Administrative based learning skills and also Female teachers and male teachers ($p<0.05$). Moreover, it was interesting to find that teachers don't have training need of Web-Based Skills; but they have training need of Administrative-based Skills and Technology-based needs. In conclusion, it is found that the first 2 gaps of teachers' training needs were bridged in 10 years. This research study was about four axes of gaps and as a result of statistical analysis 2 gaps of teachers training needs, language and gender, is found to exist in 2020.

On the other hand, this research study is limited with 490 teachers who have accepted to participate in the research by solving online questionnaire. In parallel to current study to bridge the bilingual and gender gap between Administrative-based skills of teachers, it is recommended to deliver Second Language (Preferably English, due to its being commonly

used language in online courses) in-service trainings for online education administration. Further studies will be delivering a research study to parents for supporting parental online guidance to their children.

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Authorship Contribution Statement

Nazime TUNCAY: *Conceptualization, design of the work, , literature search, data collection, data analysis, , data interpretation, writing - review and editing.*

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