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An investigation of secondary school teachers' flipped classroom readiness

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In the descriptive study reported on here we used A Scale for Flipped Classroom Readiness of Secondary School Learners developed by Hao and adapted by Durak to evaluate teachers' readiness. The scale was administered to 233 teachers working at 5 randomly selected secondary schools in the city of Elazig, Turkey. Five key aspects of their readiness to conduct flipped classroom education were investigated: "self-efficacy in controlling learners, technological self-efficacy, self-efficacy for planning classroom time, readiness for preparatory work and being open-minded." In general, overall readiness was found to be positive for young teachers who had recently joined the profession. Teachers who owned computers and perceived themselves as being competent users of information and communications technology were more likely to have favourable opinions of their ability to implement flipped classroom pedagogy.

Keywords: flipped classroom; readiness for preparatory work; self-efficacy for planning classroom time; technology self-efficacy

Introduction

The 21st century compels individuals to make modifications in every aspect of life. With the growth of technology and science, substantial changes have occurred in the domain of education as well. In particular, our planet is now in the grip of the Coronavirus disease (COVID-19) pandemic. Because of this situation, face-to-face education has been interrupted and distance learning using computer equipment and the internet has gained popularity. Digitalisation in education has thus become important, which may result in education becoming more efficient and the number of competent individuals being enhanced. Flipped classroom pedagogy is a teaching and learning model in which technology is used. Since teachers are of vital importance in education settings, investigating their readiness for this model is beneficial for policymakers. Technology has become an integral part of educational settings and the process of developing education policy using technology has begun. Technology integrated with the teaching and learning process increases the quality of education and changes the ways in which teachers teach and learners learn (Chai, Koh & Tsai, 2013). The education system has begun to emphasise learner-centred learning rather than teacher-centred instruction (Hwang, Lai & Wang, 2015). The constant technological innovations that have generated resources that may be employed in an educational environment have prompted changes in the teachers' profile and position, as well as in instructional techniques (Gorgoretti, 2019). The traditional model in which the teacher is a strict provider of knowledge has been replaced with a new model in which the teacher guides learners to learn on their own, in other words, teachers should be guides on the side rather than sages on the stage (Morrison, 2014). In the 21st century – an inventive century in which people are seeking more effective methods to integrate scientific and technical knowledge into new processes – it is anticipated that learning settings should be equipped with advanced technology (Bolat, 2016). Flipped classroom is a teaching process in which technology is frequently applied. This model is based on providing learners with online information on the subject before class time and expecting them to work and understand the subject prior to coming to class, thus enabling the teacher to reinforce the subject through interactive activities in the classroom (Bokosmaty, Bridgeman & Muir, 2019; Davies, Dean & Ball, 2013; Fulton, 2012; Lage, Platt & Treglia, 2000; Talbert, 2012). The teachers' role is critical for the successful implementation of flipped classroom pedagogy, therefore, they should acknowledge the change and be informed about new developments in technology to adopt a new teaching model (Akgün, 2017; Hardy, 1999; Steen-Utheim & Foldnes, 2018). For this reason the goal of the research reported on here was to investigate the readiness of teachers for flipped classroom pedagogy.

Literature Review

Flipped classroom was proposed by Bergmann and Sams (2012) to meet the needs of learners who could not attend regular classes or wished to review lecture content in their own time. Their recommendation to provide access to learning resources and lectures online has been adopted in many countries, Turkey included. In contrast to traditional teaching, flipped classroom is based on the notion that learners study a subject at home and class time is reserved for reinforcing activities and for doing what was previously called homework (Zownorega, 2013). This new approach has been seen to benefit learners as it provides them with the opportunity to study the subject at their own pace. It is also useful for teachers who find themselves under pressure to implement active learning strategies while imparting knowledge in the form of traditional lectures (Strayer, 2012). With flipped classroom, instead of teaching the subject in class, metacognitive activities such as

problem-solving, discussions, role play, etc. can be implemented in class. While flipped classroom has fundamentally changed the traditional role of teachers in the learning process, its success depends on teachers being facilitators of learners' learning. They are expected to encourage learners' self-directed learning skills and to help learners become responsible for their learning.

In the flipped classroom model, learners are required to acquire knowledge from different types of out-of-class learning materials, such as micro-videos, micro-lectures, and other educational internet resources, and study the subject before coming to the class. The teacher controls their learning process and guides them to be responsible. In order to achieve this, the teacher is required to prepare an online environment and to provide for strong interaction among learners (Evseeva & Solozhenk, 2015). In flipped classroom teachers do not give direct instruction but, instead, they play the role of facilitator who sets up the content, maps out homework, and provides a welcoming learning space in which learners may explore. In addition, teachers need to be able to monitor online discussions without leading learners (Ogbonna, Ibezim & Obi, 2019). Given that flipped classroom is a technology-based model, teachers have a critical role in maintaining motivation, providing guidance for learners and encouraging them to take responsibility for their own learning (Marsh, 2012). Clearly these activities specify new roles for teachers in successfully applying flipped classroom pedagogy.

Methodology

Research Goal

With this study we set out to investigate secondary school teachers' flipped classroom readiness and to determine whether they had the required competences to implement flipped classroom. Moreover, we aimed to compare the teachers' readiness in terms of various variables across five sub-dimensions: self-efficacy in controlling the learners, technological self-efficacy, self-efficacy for planning classroom time, readiness for preparatory work, and being open-minded, or not.

Research Method

In this study we investigated the flipped classroom readiness of secondary school teachers and used a descriptive survey method to acquire sufficient information to understand their existing circumstances.

Sample

A total of 233 teachers working at five different secondary schools in Elazig, Turkey, participated in this study conducted during the 2018–2019 academic year. Simple random sampling was administered to determine the sample group. All teachers participated voluntarily.

Table 1 Demographic information of teachers

		Frequency	Percentage
Gender	Female	152	65.2
	Male	81	34.8
Age	Between 22 and 29	39	16.7
	Between 30 and 37	73	31.3
	Between 38 and 45	76	32.6
	46 and older	45	19.4
Branch	Turkish	47	20.2
	Mathematics	45	19.3
	Social studies	25	10.7
	English	31	13.3
	Science	36	15.5
	Religious culture	13	5.6
	Music	6	2.6
	Technology design course	14	6.0
	Information technologies	10	4.2
	Arts	6	2.6
Secondary school	School 1	60	25.8
	School 2	49	21.0
	School 3	61	26.2
	School 4	40	17.1
	School 5	23	9.9
Professional seniority	1–5 years	39	16.6
	6–10 years	50	21.5
	11–15 years	43	18.5
	16–20 years	44	18.9
	20 years and more	57	24.5
Total		233	100.0

Table 1 shows the demographic profile of the teachers of who 65.2% were female. In terms of age, 16.7% were between 22 and 29 years old, 31.3% were between 30 and 37 years old, 32.6% were between 38 and 45 years old, and 19.4% were older than 46 years. The majority of participants were aged between 30 and 45. Their teaching subjects were Turkish, mathematics, science and English respectively. According to the school variable, 25.8% of the teachers were from School 1, 21.0% from School 2, 26.2% from School 3, 17.1% from School 4 and 9.9% from School 5. In terms of teaching experience, 16.6% teachers had 1 to 5 years', 21.5% had 6 to 10 years', 18.5% had 11 to 15 years', 18.9% had 16 to 20 years' and the rest had 20 years' and more experience.

Teachers' Technology Usage and Their Prior Knowledge of Flipped Classroom

As seen in Table 2, the majority of participants possessed computers and had internet access. While 43.8% perceived themselves proficient in the use of information and communication technology, 48.9% indicated being partly so, and only 7.3% felt they were not proficient. Smart boards were available for use by 79.0% of teachers and 53.6% had internet access in their classrooms. In total 67.4% teachers said they were actively using technology in the classroom.

Table 2 Teachers' technology usage and prior knowledge of flipped classroom

		Frequency	Percentage
Do you have a computer?	Yes	222	95.3
	No	11	4.7
Do you have access to the internet?	Yes	213	91.4
	No	20	8.6
How do you perceive your use of technology in class?	Sufficient	102	43.8
	Partly sufficient	114	48.9
	Insufficient	17	7.3
What kind of technological equipment is there in your school?	Smart board	184	79.0
	Internet	125	53.6
Do you use technology actively in your classroom?	Yes	157	67.4
	No	76	32.6
Have you ever heard of flipped classroom?	Yes	64	27.5
	No	169	72.5
Have you ever implemented flipped classroom in your teaching?	Yes	20	8.6
	No	213	91.4

In terms of prior knowledge, a total of 27.5% of participants had heard of flipped classroom and 8.6% of them said that they had implemented this model in their classrooms. It was remarkable that 72.5% had no knowledge of flipped classroom and 91.4% had no experience of implementing it.

Data Collection

A Scale for Flipped Classroom Readiness of Secondary School Learners produced by Hao (2016) and used by Durak (2017) was used in this research. The original scale consisted of 26 elements. Following a study of the literature and taking the fundamental concepts of a flipped classroom into consideration, we added 10 items. Five sub-dimensions, namely self-efficacy in controlling the learners, technological self-efficacy, self-efficacy for arranging classroom time, preparedness for preparation work, and being open-minded, were incorporated in the original scale. The original scale is a 5-point Likert scale scaled from "Strongly disagree" (1) to "Strongly agree" (5). Factor analysis was done and Cronbach's Alpha score for the scale was derived as 0.883, and those for the sub-dimensions were 0.799, 0.931, 0.853, 0.910, and 0.922, respectively.

Data Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) Program Version 22.0. For demographic data, descriptive statistical approaches such as percentage, arithmetic mean, and standard deviation were employed. Moreover, to analyse the data according to the variables, the Shapiro Wilk test was done and the homogeneity of variances were checked. As the distribution was not normal ($p < 0.05$), the Mann Whitney U test and the Kruskal-Wallis H test were used. In addition, to establish which group produced differences, post-hoc tests were used.

Results

Findings are presented in the tables below and show whether the sub-dimension scores of the teachers that took part in sample group differed significantly from the defined variables.

Table 3 Teachers' beliefs about their flipped classroom readiness

	N	*M*	*SD*
Self-efficacy in controlling the learners	233	3.9254	.54487
Technological self-efficacy	233	4.1350	.81386
Self-efficacy for planning classroom time	233	4.2425	.63712
Readiness for preparatory work	233	3.4378	.78868
Being open-minded	233	4.0052	.75245
Flipped classroom	233	3.9492	.59720

The findings reveal that the teachers strongly agreed with having the attributes for flipped classroom demands (M = 3.94) and were highly proficient in the five sub-dimensions. As shown in Table 3, teachers strongly agreed with being able to control the learners (M = 3.92), technological self-efficacy (M = 4.13), self-efficacy for planning classroom time (M = 4.24), readiness for preparatory work (M = 3.43), and being open-minded (M = 4.00). Accordingly, the flipped classroom readiness of secondary school teachers was generally regarded as being positive.

The Mann Whitney U (MWU) test findings reveal that there was no statistical difference between the scores for flipped classroom readiness based on the gender of the instructor. Gender as variable thus had no significant effect on flipped classroom readiness in general.

The Kruskal-Wallis H (KWH) test results performed to determine whether sub-dimension scores showed differences between the teachers of different age groups, there was a statistical difference between the scores for technological self-efficacy, self-efficacy for planning classroom time and flipped classroom in favour of teachers in the 22 to 29 and 30 to 37 age groups compared to the ones who were 46 years and older. It might thus be assumed that the younger teachers had greater flipped classroom readiness. On the other hand, no statistical difference was established between the scores relating to self-efficacy in controlling the learners, readiness for preparatory work, being open-minded and the age of the instructors. It can be said that the teachers' age had no significant effect on their readiness for preparatory work, skill for controlling learners and open-mindedness.

The KWH test results performed to determine whether sub-dimension scores showed differences between the teachers' branches show a statistical difference between scores for controlling the learners, technological self-efficacy, self-efficacy for planning classroom time, readiness for preparatory work, flipped classroom readiness and the branch variable of teachers. Turkish, mathematics, English, and informational technologies teachers obtained higher scores than the others. It can be understood that most of the flipped classroom studies were carried out in these branches (Davies et al., 2013; Jamaludin & Osman, 2014; Johnston, 2017; Thaichay & Sitthiticul, 2016; Wiginton, 2013). Given that flipped classroom is a technology-based teaching model, it is an expected result that informational technologies teachers will have more flipped classroom readiness. On the other hand, English is a subject that can be taught and learned easily by means of technology, that is why, it is normal that English teachers had flipped classroom readiness.

The KWH test results performed to determine whether sub-dimension scores showed differences between the professional seniority of teachers confirmed that there was a statistical difference between scores relating to technological self-efficacy and flipped classroom in favour of teachers who had 1 to 5 years', 6 to 10 years' and 11 to 15 years' teaching experience. Teachers with 11 to 15 years' experience showed more technological self-efficacy and flipped classroom readiness than those who had been teaching for more than 16 years. It can be inferred that these findings are coherent with the age variable of teachers. Younger teachers had more flipped classroom readiness than their older colleagues. Nevertheless, it was clear that teachers' experience in the profession had no significant effect on the other sub-dimensions.

Table 4 Teachers with access to a computer and the internet

	Access to a computer						Access to the internet				
		N	*M*	*U*	*p*			*N*	*M*	*U*	*p*
A	Yes	222	119.86	587.00	.004	A	Yes	213	117.07	2114.50	.054
	No	11	59.36				No	20	116.23		
B	Yes	222	120.89	358.00	.000	B	Yes	213	116.49	2021.50	.378
	No	11	38.55				No	20	122.43		
C	Yes	222	119.85	589.00	.003	C	Yes	213	116.48	2019.50	.388
	No	11	59.55				No	20	122.53		
D	Yes	222	119.57	650.50	.009	D	Yes	213	117.61	1999.50	.453
	No	11	65.14				No	20	110.48		
E	Yes	222	120.02	550.50	.002	E	Yes	213	118.22	1870.50	.906
	No	11	56.05				No	20	104.03		
FC	Yes	222	120.40	466.00	.001	FC	Yes	213	117.33	2059.00	.246
	No	11	48.36				No	20	113.45		
	Total	233					Total	233			

The results of the MWU tests shown in Table 4 confirm that a statistical difference existed between the scores relating to controlling the learners, technological self-efficacy, self-efficacy for planning classroom time, readiness for preparatory work, being open-minded and flipped classroom in favour of the teachers who has access to a computer ($p < 0.05$). In other words, instructors who had access to a computer showed more flipped classroom readiness than those who did not have access. The flipped classroom paradigm is founded on the premise that learners will study a topic in their own time and at their own speed. Learners are asked to view online videos or study the topic by using the internet and a computer. Accordingly, instructors are in charge of generating lecture films for their pupils and supervising their learning online. For instance, instructors are required to provide films to learners and ask and answer their questions whenever and wherever they wish. On the other hand, they must develop and provide online tests to learners to analyse their learning. Therefore, having access to a computer and the internet is a key aspect that influences their flipped classroom readiness. To implement flipped classroom pedagogy successfully, it is necessary for both teachers and learners to have access to a computer and the internet. While it is not surprising that teachers who had a computer obtained higher scores on each sub-dimensions and showed more flipped classroom readiness than the ones who did not, no statistical difference was found between the scores for flipped classroom readiness and each sub-dimension and having internet access. Having internet access had no significant effect on the teachers' flipped classroom readiness.

Table 5 Levels of teachers' use of technological devices

Level of using technological devices		*N*	*M*	X^2	*SD*	*p*	Post-hoc LSD
Self-efficacy in controlling the learners	a) Sufficient	102	135.47	14.586	2	.001	a>c
	b) Average	114	104.75				b>c
	c) Insufficient	17	88.29				
Technological self-efficacy	a) Sufficient	102	147.97	49.734	2	.000	a>c
	b) Average	114	100.45				b>c
	c) Insufficient	17	42.21				
Self-efficacy for planning classroom time	a) Sufficient	102	123.84	7.532	2	.023	a>c
	b) Average	114	117.00				
	c) Insufficient	17	75.94				
Readiness for preparatory work	a) Sufficient	102	145.02	35.792	2	.000	a>c
	b) Average	114	99.93				b>c
	c) Insufficient	17	63.29				
Being open-minded	a) Sufficient	102	141.49	27.801	2	.000	a>c
	b) Average	114	102.21				b>c
	c) Insufficient	17	69.24				
Flipped classroom	a) Sufficient	102	144.86	36.964	2	.000	a>c
	b) Average	114	100.86				b>c
	c) Insufficient	17	58.06				
	Total	233					

As seen in Table 5, a significant difference was established between the scores for all sub-dimensions in favour of instructors who viewed themselves as adept enough to use technological gadgets in contrast to those who assessed themselves as average or inadequate ($p < 0.05$). When the nature of the flipped classroom is considered, it is natural that the more adept instructors used technological gadgets, and that they showed greater flipped classroom readiness. In

the flipped classroom model instructors need to actively employ technological gadgets. With the rapid development of technology, instructors may teach any knowledge or any lecture whenever and wherever they want to by means of tablets, smart phones, laptops, computers, etc. via online platforms. They can prepare online examinations and send these to their learners; they can thus assess the learners' learning outside of class time. Therefore, being self-sufficient in using electronic gadgets is of major significance for effective flipped classroom implementation. Being skilled at using technology is an essential aspect that impacts teachers' flipped classroom readiness. The outcomes of this research suggest that those instructors who regarded themselves as being skilled enough or average at using technological gadgets had greater flipped classroom preparedness than those who perceived themselves as inadequately adept.

Table 6 Teachers with access to smart boards and the internet in their classrooms

	Smart board						Internet access				
		N	*M*	*U*	*p*			*N*	*M*	*U*	*p*
A	Yes	184	118.35	4260.0	.553	A	Yes	125	124.88	5765.5	.054
	No	49	111.94				No	108	107.88		
B	Yes	184	112.54	3687.0	.049	B	Yes	125	116.84	6729.5	.968
	No	49	133.76				No	108	117.19		
C	Yes	184	129.57	3892.0	.137	C	Yes	125	115.03	6503.5	.627
	No	49	113.65				No	108	119.28		
D	Yes	184	117.73	4374.0	.749	D	Yes	125	124.92	5759.5	.053
	No	49	114.27				No	108	107.83		
E	Yes	184	115.79	4285.0	.593	E	Yes	125	117.04	6744.5	.991
	No	49	121.55				No	108	116.95		
FC	Yes	184	115.48	4228.0	.504	FC	Yes	125	121.28	6215.0	.297
	No	49	122.72				No	108	112.05		
	Total	233					Total	233			

The results of the MWU tests shown in Table 6 confirm that a statistical difference existed between the scores for technological self-efficacy in favour of teachers who had smart boards at the schools where they worked ($p < 0.05$). It can be inferred that the teachers at schools where there were smart boards obtained a higher score for technological self-efficacy than the ones who worked at schools without smart boards. In order to implement the flipped classroom model successfully, technology should be used at the highest level to maximise both in-class and out-of-class time. While performing in-class activities, teachers are required to use the smart board. Moreover, in order to use these boards efficiently, there must be internet access. Teachers can thus perform metacognitive activities such as debates, problem-solving, jigsaw puzzles, etc. that support learners' previous learning via a smart board with internet access. These devices can ease teachers' work in flipped classroom pedagogy. For these reasons, having a smart board and internet access in the classroom may affect teachers' flipped classroom readiness. However, there was no statistical difference between these variables and teachers' flipped classroom readiness ($p > 0.05$). In other words, having a smart board and internet access in the classroom had no effect on teachers' flipped classroom readiness.

Table 7 Teachers using technology actively during the teaching process

		N	*M*	*U*	*p*
Self-efficacy in controlling the learners	Yes	157	123.80	4898.500	.026
	No	76	102.95		
Technological self-efficacy	Yes	157	122.03	5176.000	.100
	No	76	106.61		
Self-efficacy for planning classroom time	Yes	157	121.30	5290.500	.157
	No	76	108.11		
Readiness for preparatory work	Yes	157	126.02	4550.000	.003
	No	76	98.37		
Being open-minded	Yes	157	124.78	4744.000	.011
	No	76	100.92		
Flipped classroom	Yes	157	125.08	4698.000	.009
	No	76	100.32		
	Total	233			

Table 7 shows that a statistical difference was found between the scores for controlling the learners, self-efficacy for planning classroom time, readiness for preparatory work, being open-minded, and flipped classroom in favour of teachers who used technology actively during

teaching ($p < 0.05$). As flipped classroom is a technology-based model used in online teaching, teachers are expected to use technology at the highest order in their classroom. While controlling learners' out-of-class activities and performing in-class activities, teachers are required to apply technology. For these reasons it is expected that teachers who use technology actively in class to have more flipped classroom readiness. This study confirms that teachers who used technology actively obtained higher scores for flipped classroom readiness than those who did not. However, surprisingly, it appears that active usage of technology had no significant effect on technological self-efficacy ($p > 0.05$). No statistical difference was found between the scores for this variable and technological self-efficacy.

Table 8 Teachers having heard about flipped classroom and implementing flipped classroom before in their classroom

	Having heard about flipped classroom						Having implemented flipped classroom in their classroom					
		N	*M*	*U*	*p*			*N*	*M*	*U*	*p*
A	Yes	64	139.43	3972.50	.002	A	Yes	20	165.10	1168.00	.001
	No	169	108.51				No	213	112.48		
B	Yes	64	137.66	4086.00	.004	B	Yes	20	143.25	1605.00	.067
	No	169	109.18				No	213	114.54		
C	Yes	64	125.16	4885.50	.250	C	Yes	20	138.33	1703.50	.134
	No	169	113.91				No	213	115.00		
D	Yes	64	140.20	3923.00	.001	D	Yes	20	163.58	1198.50	.001
	No	169	108.21				No	213	112.63		
E	Yes	64	143.88	3688.00	.000	E	Yes	20	157.80	1314.00	.004
	No	169	106.82				No	213	113.17		
FC	Yes	64	142.15	3798.00	.000	FC	Yes	20	164.33	1184.00	.001
	No	169	107.48				No	213	112.56		
	Total	233					Total	233			

Table 8 shows that a statistical difference existed between the scores for controlling learners, technological self-efficacy, readiness for preparatory work, being open-minded, and flipped classroom in favour of teachers who had heard about the flipped classroom model before ($p < 0.05$). Teachers who had heard about flipped classroom and understood the model clearly had more flipped classroom readiness than those who had not. The flipped classroom model as a teaching and learning approach has become popular in recent years. Teachers need to follow the latest developments in the field of education in order to fulfil learners' needs. Over time the role of learners as well as teachers have changed in our education system. Teachers are expected to do research about new changes in the field of education and the latest teaching and learning approaches, in addition to implementing the ones that are suitable for their learners. The results of our study thus show that teachers who have heard about flipped classroom and implemented this model in their classroom had more flipped classroom readiness than those who had not.

Discussion

Relatively little research has been done and published on the topic of flipped classroom in terms of teachers' perspectives, which resulted in the urgent necessity for such studies. Furthermore, COVID-19 has had such a great impact on the education system and, therefore, online learning has become a necessity all over the world. Flipped classroom pedagogy is one of the most recent techniques that allows for online education. That is why researching teachers' preparedness for this model has essential relevance for the endurance of the teaching-learning processes as well as the economic well-being of nations.

The majority of secondary school instructors who participated in this survey were found to have had relatively high levels of flipped classroom readiness. When the findings were evaluated in terms of sub-dimensions, it was clear that the participants could control learners in their classrooms. With the integration of technology into education, the expected roles of both learners and teachers have changed. The traditional role of the teacher to provide instruction in the classroom has been abandoned. Moreover, in today's education, teachers are expected to be pathfinders or advisor to their learners. Teachers should be skilled at controlling learners, guiding them successfully during the learning process, and cooperating with their colleagues and learners. We can thus understand that the teacher is the most important player in successful teaching and learning and that they directly influence the level of learning and in-classroom communication (Hendrickx, Mainhard, Boor-Klip, Cillessen & Brekelmans, 2016; Ryan & Patrick, 2001). Furthermore, the flipped classroom model requires great responsibility from teachers as well as learners. Teachers are required to become facilitators who establish the content and provide a learning space for learners. If a teacher makes an effort to support learners or to develop motivation

and expectancy towards learning, both the learner and the teacher experience the teaching and learning process positively, resulting in this positive cycle repeating itself (Du Toit-Brits, 2019). When implementing flipped classroom, teachers spend most of their time following learners' progress and correcting their mistakes (Sage & Sele, 2015). Therefore, it is of great importance that teachers should have the necessary skills to control learners during the learning and teaching process in order to implement the flipped classroom successfully. Modern-day teachers teach the so-called "digital natives" (Prensky, 2001:1) who were born and raised during the emergence of the new information and communications technologies and can use them actively in every aspect of their lives. To teach these individuals, also known as Generation Z, for whom the internet and computers have been part of their lives from birth (Dimock, 2019), it has become a necessity to use educational technologies effectively in teaching (Orhan, Kurt, Ozan, Vural & Türkan, 2014). Therefore, technology should be used at the highest order in the learning environment (Filiz & Kurt, 2015). However, using technological devices efficiently depends mostly on the teachers. In order to adapt in this period of change, teachers must accept the change and be informed and keep abreast of new technological developments (Akgün, 2017; Hardy, 1999).

The results of this study confirm that younger teachers have shown more technological self-efficacy and flipped classroom readiness than older teachers. Accordingly, it can be said that younger teachers are more prepared to implement flipped classroom pedagogy in their classrooms. Flipped classroom is a model based on learners studying the lecture before class and enables the teacher to reinforce learning with metacognitive activities in class (Youngkin, 2014) and to evaluate learner's progress using online platforms (Temizyürek & Ünlü, 2015). For these reasons, having high technological self-efficacy influence teachers' flipped classroom readiness positively. For successful flipped classroom implementation, teachers also should be skilled at time management – they should be good planners and organisers. In order to guide the learners and help them to develop self-directed learning skills, teachers should be skilled in planning their own teaching process (Kriewaldt, 2001). A well-planned learning environment will provide for effective learning and strong classroom communication through group activities, discussions, debates, etc. (Ryan & Patrick, 2001). In well-planned classrooms teachers become active observers who can spend more time with individual learners. Furthermore, teachers should arrange classroom activities by taking learners' individual differences into consideration so that learners feel that they belong – something that contributes learners' experience of success. It is thus clear that teachers' self-efficacy for planning classroom time is an important factor in the successful implementation of the flipped classroom model.

The teacher has significant responsibilities to find and/or prepare applicable learning material, choose appropriate content and other activities, assign these to learners online, follow the learner's progress, and assess their learning. Moreover, they should plan metacognitive activities that are done in class to reinforce learning. At that point it is inferred that the most important issue for the efficient implementation of the flipped classroom model is the teachers' readiness to do the preparatory work. If they work effectively, the aim of the flipped classroom model will be realised. Teachers also have great responsibility to open ways to new teaching and learning approaches and this accounts for why teachers' open-mindedness effects their flipped classroom readiness positively.

Most studies carried out focused on the fields of language, mathematics, and informational technologies (Başal, 2012; Davies et al., 2013; Ekmekçi, 2014; Jamaludin & Osman, 2014; Johnson & Renner, 2012; Johnston, 2017; Mok, 2014; Strayer, 2011; Thaichay & Sitthiticul, 2016; Wiginton, 2013). The findings of these studies were similar to those of our study in that teachers in these fields have more flipped classroom readiness than others. In flipped classroom, technology is employed actively. Computer and internet access are two main factors for success. When the data from the research were evaluated, it was revealed that instructors who had a computer showed greater flipped classroom readiness than those who did not. Flipped classroom includes in-class and out-of-class activities. Out-of-class activities are prepared and done using a computer and the internet (Bishop & Verleger, 2013). Lessons are recorded on video and are sent to learners through online platforms (Missildine, Fountain, Summers & Gosselin, 2013; O'Flaherty & Phillips, 2015). In order to assess learners' progress, teachers can forward short quizzes and other assessments to learners. Having access to a computer is thus a factor that effects teachers' flipped classroom readiness.

Our research shows that instructors who regard themselves as adequately skilled in the use of technological gadgets are more ready to use the flipped classroom method than those who feel that they are less capable of using technology. The flipped classroom model is characterised as a teaching process carried out at home by means of the internet, reinforcing the topic with such activities as discussions, and peer or group activities. In order for instructors to prepare correctly, they must be skilled at using technological gadgets, since all previews in a flipped classroom, may be done by means of

technology. Furthermore, this research indicates that instructors who were competent in using technology showed greater flipped classroom readiness.

Findings from this descriptive study will assist in shaping policies and initiatives to increase the integration of technology in learning settings. Due to the importance of instructors in implementing a new approach, researchers may use these findings to train secondary school teachers for flipped classrooms readiness and to maximize the benefits of technological improvements in learning settings.

Suggestions

Based on the findings, we make the following recommendations:

- In order to implement the flipped classroom model successfully, teachers require access to necessary technology and equipment.
- Teachers who find themselves lacking in using technology should be supported with appropriate training.
- Teachers who are not familiar with the methods of the flipped classroom model should be made aware of this approach and its implications.
- In this study, data were collected using a scale; additional experimental studies may be conducted to establish flipped classroom readiness.
- This study was carried out with a limited number of teachers who worked at secondary schools. New and original studies should be carried out with larger numbers of teachers working with various grades.

Authors' Contributions

Cemre Kurtoğlu wrote the manuscript and provided data for all tables. İbrahim Yaşar Kazu read through the manuscript and interpreted the results. Both authors reviewed the final manuscript.

Notes

i. This article is based on the master thesis of Cemre Kurtoğlu.

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References

Akgün F 2017. Öğretim elemanlarının bireysel yenilikçilik özellikleri ve öğretim teknolojilerine yönelik kabulleri [Investigation of instructional technology acceptance and individual innovativeness of academicians]. *Turkish Online Journal of Qualitative Inquiry*, 8(3):291–322. https://doi.org/10.17569/tojqi.292135

Başal A 2012. *The use of flipped classroom in foreign language teaching*. Paper presented at the 3rd Black Sea ELT Conference "Technology: A Bridge to Language Learning", Samsun, Turkey, 15–17 November.

Bergmann J & Sams A 2012. *Flip your classroom: Reach every student in every class every day:* Washington, DC: International Society for Technology in Education.

Bishop JL & Verleger MA 2013. *The flipped classroom: A survey of the research*. Paper presented at the 120th American Society for Engineering Education (ASEE) annual conference and exposition, Atlanta, GA, 23–26 June. https://doi.org/10.18260/1-2--22585

Bokosmaty Y, Bridgeman A & Muir M 2019. Using a partially flipped learning model to teach first year undergraduate chemistry. *Journal of Chemical Education*, 96(4):629–639. https://doi.org/10.1021/acs.jchemed.8b00414

Bolat Y 2016. Ters yüz edilmiş sınıflar ve eğitim bilişim ağı (EBA) [The flipped classes and education information network (EIN)]. *Journal of Human Sciences*, 13(2):3373–3388. https://doi.org/10.14687/jhs.v13i2.3952

Chai CS, Koh JHL & Tsai CC 2013. A review of technological pedagogical content knowledge. *Educational Technology & Society*, 16(2):31–51.

Davies RS, Dean DL & Ball N 2013. Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Education Technology Research and Development*, 61:563–580. https://doi.org/10.1007/s11423-013-9305-6

Dimock M 2019. *Defining generations: Where millennials end and Generation Z begins*. Available at https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/. Accessed 21 October 2020.

Durak HY 2017. Ortaokul öğrencileri için ters yüz öğrenme hazırbulunuşluk ölçeğinin Türkçeye uyarlanması [Turkish adaptation of the flipped learning readiness scale for middle school students]. *Bartın Üniversitesi Eğitim Fakültesi Dergisi*, 6(3):1056–1068. https://doi.org/10.14686/buefad.328826

Du Toit-Brits C 2019. A focus on self-directed learning: The role that educators' expectations play in the enhancement of students' self-directedness. *South African Journal of Education*, 39(2):Art. #1645, 11 pages. https://doi.org/10.15700/saje.v39n2a1645

Ekmekçi E 2014. Flipped writing class model with a focus on blended learning. PhD dissertation. Ankara, Turkey: Gazi University.

Evseeva A & Solozhenko A 2015. *Use of flipped classroom technology in language learning*. Paper presented at the XV International Conference "Linguistic and Cultural Studies: Traditions and Innovations", LKTI 2015, Tomsk , Russia, 9–11 November.

Filiz O & Kurt AA 2015. Flipped learning: Misunderstandings and the truth. *Journal of Educational Sciences Research*, 5(1):215–229. https://doi.org/10.12973/jesr.2015.51.13

Fulton K 2012. Upside down and inside out: Flip your classroom to improve student learning. *Learning & Leading with Technology*, 39(8):12–17. Available at https://files.eric.ed.gov/fulltext/EJ982840.pdf. Accessed 28 February 2022.

Gorgoretti B 2019. The use of technology in music education in North Cyprus according to student music teachers. *South African Journal of Education*, 39(1):Art. #1436, 10 pages. https://doi.org/10.15700/saje.v39n1a1436

Hao Y 2016. Middle school learners' flipped learning readiness in foreign language classrooms: Exploring its relationship with personal characteristics and individual circumstances. *Computers in Human Behavior*, 59:295–303. https://doi.org/10.1016/j.chb.2016.01.031

Hardy JV 1999. Teacher attitudes toward and knowledge of computer technology. *Computers in the Schools*, 14(3-4):119–136. https://doi.org/10.1300/J025v14n03_11

Hendrickx MMHG, Mainhard MT, Boor-Klip HJ, Cillessen AHM & Brekelmans M 2016. Social dynamics in the classroom: Teacher support and conflict and the peer ecology. *Teaching and Teacher Education*, 53:30–40. https://doi.org/10.1016/j.tate.2015.10.004

Hwang GJ, Lai CL & Wang SY 2015. Seamless flipped learning: A mobile technology-enhanced flipped classroom with effective learning strategies. *Journal of Computers in Education*, 2:449–473. https://doi.org/10.1007/s40692-015-0043-0

Jamaludin R & Osman SZM 2014. The use of a flipped classroom to enhance engagement and promote active learning. *Journal of Education and Practice*, 5(2):124–131. Available at https://www.researchgate.net/profile/Siti-Md-Osman/publication/298787589_The_Use_of_a_Flipped_Classroom_to_Enhance_Engagement_and_Promote_Active_Learning/links/56eb6dc808ae9dcdd82aba03/The-Use-of-a-Flipped-Classroom-to-Enhance-Engagement-and-Promote-Active-Learning.pdf. Accessed 28 February 2022.

Johnson LW & Renner JD 2012. Effect of the flipped classroom model on secondary computer applications course: Student and teacher perceptions, questions and learner achievement. PhD dissertation. Louisville, KY: University of Louisville.

Johnston BM 2017. Implementing a flipped classroom approach in a university numerical methods mathematics course. *International Journal of Mathematical Education in Science and Technology*, 48(4):485–498. https://doi.org/10.1080/0020739X.2016.1259516

Kriewaldt J 2001. A thinking geography curriculum. *Interaction*, 29(4):1–7.

Lage M J, Platt GJ & Treglia M 2000. Inverting the classroom: A gateway to creating an inclusive learning environment. *The Journal of Economic Education*, 31(1):30–43.

Marsh D 2012. *Blended learning: Creating learning opportunities for language learners.* Cambridge, England: Cambridge University Press.

Missildine K, Fountain R, Summers L & Gosselin K 2013. Flipping the classroom to improve student performance and satisfaction. *Journal of Nursing Education*, 52(10):597–599. https://doi.org/10.3928/01484834-20130919-03

Mok HN 2014. Teaching tip: The flipped classroom. *Journal of Information Systems Education*, 25(1):7–11. Available at https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?article=3363&context=sis_research. Accessed 28 February 2022.

Morrison CD 2014. From 'sage on the stage' to 'guide on the side': A good start. *International Journal for the Scholarship of Teaching & Learning*, 8(1):1–15. https://doi.org/10.20429/ijsotl.2014.080104

O'Flaherty J & Phillips C 2015. The use of flipped classrooms in higher education: A scoping review. *The Internet and Higher Education*, 25:85–95. https://doi.org/10.1016/j.iheduc.2015.02.002

Ogbonna CG, Ibezim NE & Obi CA 2019. Synchronous versus asynchronous e-learning in teaching word processing: An experimental approach. *South African Journal of Education*, 39(2):Art. #1383, 15 pages. https://doi.org/10.15700/saje.v39n2a1383

Orhan D, Kurt AA, Ozan Ş, Vural SS & Türkan F 2014. A holistic view to national educational technology standards. *Karaelmas Journal of Educational Sciences*, 2:65–79.

Prensky M 2001. Digital natives, digital immigrants Part 1. *On the Horizon*, 9(5):1–6. https://doi.org/10.1108/10748120110424816

Ryan AM & Patrick H 2001. The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal*, 38(2):437–460. https://doi.org/10.3102/00028312038002437

Sage M & Sele P 2015. Reflective journaling as a flipped classroom technique to increase reading and participation with social work learners. *Journal of Social Work Education*, 51(4):668–681. https://doi.org/10.1080/10437797.2015.1076274

Steen-Utheim AT & Foldnes N 2018. A qualitative investigation of student engagement in a flipped classroom. *Teaching in Higher Education*, 23(3):307–324. https://doi.org/10.1080/13562517.2017.1379481

Strayer JF 2011. *The teacher's guide to flipped classroom.* Available at http://www.edudemic.com/guides/flipped-classrooms-guide/. Accessed 15 January 2020.

Strayer JF 2012. How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learning Environment Research*, 15(2):171–193. https://doi.org/10.1007/s10984-012-9108-4

Talbert R 2012. Inverted classroom. *The Internet and Higher Education*, 15:89–95.

Temizyürek F & Ünlü NA 2015. Dil öğretiminde teknolojinin materyal olarak kullanımına bir örnek: "Flipped classroom" [The use of technology in language teaching material as an example: "Flipped classroom"]. *Bartin University Journal of Faculty of Education*, 4(1):64–72. https://doi.org/10.14686/BUEFAD.2015111015

Thaichay T & Sitthitikul P 2016. Effects of the flipped classroom instruction on language accuracy and learning environment: A case study of Thai EFL upper-secondary school learners. *Rangsit Journal of Educational Studies*, 3(2):35–63. Available at https://rsujournals.rsu.ac.th/index.php/RJES/article/view/2274/1784. Accessed 28 February 2022.

Wiginton BL 2013. Flipped instruction: An investigation into the effect of learning environment on learner self-efficacy, learning style, and academic achievement in an Algebra classroom. PhD dissertation. Tuscaloosa, AL: The University of Alabama. Available at https://www.proquest.com/docview/1505373684?p

q-origsite=gscholar&fromopenview=true. Accessed 28 February 2022.

Youngkin CA 2014. The flipped classroom: Practices and opportunities for health sciences librarians. *Medical Reference Services Quarterly*, 33(4):367–374. https://doi.org/10.1080/02763869.2014.957073

Zownorega SJ 2013. The effectiveness of flipping the classroom in a honors level, mechanics-based physics class. Master of Science in Natural Sciences Concentration in Physical Science thesis. Charleston, IL: Eastern Illinois University. Available at https://thekeep.eiu.edu/cgi/viewcontent.cgi?article=2154&context=theses. Accessed 28 February 2022.