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A Study To Determine The eTwinning-Related Views Of The Teachers In The eTwinning Network Countries, And Their Digital Literacy Levels

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Article Info	ABSTRACT
	The main aim of this study is to compare the digital literacy levels of teachers in Turkey and of those in other member countries within the European Union eTwinning network. The present study has been conducted with a mixed methods research design, in which quantitative and qualitative methods are used together. The quantitative data of the research have been collected online from a total of 181 teachers, 106 from Turkey and 75 from the member countries of the eTwinning network by using the *Digital Literacy Scale*, while the qualitative data have been obtained from a total of 111 teachers. The quantitative data have been analyzed by using descriptive statistics and independent sample *t* test, whereas the qualitative data have been analyzed in line with the descriptive analysis approach by using the MaxQDA 2020 program. As a result of the research, the digital literacy levels of the teachers working in Turkey and those in the member countries of the European Union eTwinning network have been found to be at high levels, with no statistically significant difference between the gender variable and digital literacy.

INTRODUCTION

Recent developments in technology and digital platforms have led to the creation of new virtual networks between schools, teachers, and students. Virtual networks that allow access, collaboration, and sharing anytime and anywhere have become critical tools for teachers (Vuorikari, et al. 2011). Such networks have increased the quality of classroom training activities, the development of teachers' professional competencies, and student performance (Hofman, 2010). Teachers make use of virtual social networks for particular purposes such as fast communication, disseminating good practices, following new approaches, informing parents, exchanging ideas with colleagues on certain issues, interacting with students and keeping track of students, easy access to information and resources, giving students assignments and assessing them (Arıkan & Yünter, 2018). One of the largest virtual networks supported by the European Union (EU) based on cooperation between teachers, students, and schools is the eTwinning platform. Operated by European Schoolnet, an international partnership of European Ministries of Education, the program started in 2005 as an education program of the European Commission. In 2014, however, it was integrated with Erasmus+, the EU's Education, Training, Youth, and Sports program.

eTwinning is a program that aims to improve inter-school cooperation in Europe and provide continuing online professional development opportunities for educators through offering support, tools and services for schools using the Information and Communication Technologies (ICT). eTwinning is Europe's largest e-learning platform, where teachers carry out projects with their students, increase their personal and professional development, and share knowledge and skills by working collaboratively. Just as people meet with their old friends through Facebook to satisfy their social needs, eTwinning meets teachers' needs to share their project ideas, communicate, and cooperate by enabling them to get together (Crawley, Gerhard, Gilleran & Joyce, 2015). Through this platform, any school in Europe can use the ICT to exchange ideas with another school, establish pedagogical partnerships, and share good practices (Papadakis, 2016; Pham, Klamma & Derntl, 2012). Teachers and students interact with each other in many different ways on projects and integrate the new knowledge they have gained into the classroom environment. This integration becomes apparent in many ways such as effective collaboration, exploration, simulation, research, and problem solving, etc., and combines traditional and innovative education approaches (Komninou, 2010). The projects also motivate teachers and students, help improve language skills, and contribute to students' in-depth learning (Fernández & Tena, 2013). eTwinning projects support Web 2.0 tools, create interesting learning environments, besides contributing to the professional development of teachers (Crawley, Gerhard, Gilleran & Joyce, 2015). The projects help teachers and students develop not only their foreign language skills but also digital literacy levels (Demir & Kayaoğlu, 2021; Fernández & Tena, 2013; Leto, 2018; Papadakis, 2016; Vuorikari, et al. 2011). The European Commission sees eTwinning as a medium to develop and promote communication and cooperation between schools in Europe through the use of the ICT (Pham, Klamma, & Derntl, 2012). eTwinning projects bring together language learning, digital literacy, ICT use, and science and mathematics, as well as various social sciences (European Commission, 2013). The eTwinning projects are based on digital technologies and digital literacy, which is the ability to take advantage of them. Digital literacy has become even more important for students, teachers, and parents since the beginning of the COVID-19 pandemic. However, there is no clarity about digital literacy in education systems, its integration into the curriculum, nor its definition.

The concept of digital competence has yet to be clearly defined, and the concepts of digital literacy, digital literacy skills, media literacy, multi-literacy, and digital competence have, therefore, been used interchangeably. Among these concepts, the concept of digital literacy seems to be used as the closest in meaning to digital competence (Ilomäki et al., 2016). Erstad (2006) defined the concept of digital competence as both the ability to run technological applications and the ability to use technology to meet individual and collective needs (Erstad, 2006). Digital literacy has been defined by the

Partnership for 21st Century Learning (P21) as media and technology-related knowledge and skills that individuals should possess in the 21st century (Framework for 21st Century Learning, 2019). Digital literacy, which is an umbrella concept, is regarded as both a must-have skill and a responsibility for the youth in the 21st century (Yılmaz, 2020). It is also the ability of citizens to access, analyse, produce, disseminate and organize information using existing technologies (Couto, Lucas, Brites & Pereira, 2018). It is a basic competence for all fields where the ICTs are applied holistically at schools (Krumsvik, 2009). Widely preferred by employers in job applications and being a factor to increase employment, digital literacy is a concept that covers access to information, knowledge integration, knowledge creation, and communication skills (UNESCO, 2010). Digital literacy, which is among the development criteria of countries, includes the cognitive, sociological, and emotional skills necessary for users to be able to work effectively in the digital environment (Sağıroğlu, Bülbül, Kılıç & Küçükali, 2020). It requires the right use of different technologies as well as the ability to reach, produce, and share the right kind of knowledge, and to possess the skills to use technology in learning and teaching processes (Hamutoğlu, Güngören, Uyanık & Erdoğan, 2017). Digital literacy is a necessary competency for today's learners to meet the informational, technical, cognitive, and socio-emotional needs rooted in the digital age (List, Brante & Klee, 2020; Ng, 2012). The use of the ICT to perform daily learning activities constitutes the technical dimension of digital literacy. The cognitive dimension, on the other hand, refers to students' ability to search, find, critically analyse, and evaluate digital information. Additionally, the socio-emotional dimension of digital literacy is the capacity of students to use the ICT for communication, cooperation, and other social goals related to learning (Ng, 2012). Prensky (2001) stated that digital natives born after the 1980s lead a technology-embedded life and learn in a way different from how previous generations did. According to Prensky, digital natives have a culture of connecting and sharing online. They access information via the internet and have an e-life when it comes to communicating with others (such as blogging, playing online games, downloading music, and shopping online etc.) and socializing through social media networks.

Up to the present, 930,355 teachers, 216,905 schools, and 121.408 projects have been involved in the eTwinning network, and new ones are being added every day. The EU countries that are members of the eTwinning network are Germany, Austria, Belgium, Bulgaria, Czechia, Denmark, Estonia, Finland, France, Netherlands, Croatia, England, Ireland, Spain, Sweden, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Poland, Portugal, Romania, Slovakia, Slovenia and Greece. Besides the EU countries, Albania, Bosnia and Herzegovina, North Macedonia, Iceland, Liechtenstein, Norway, Serbia, and Turkey also participate in the eTwinning programs. Moreover, eTwinning Plus includes Armenia, Azerbaijan, Georgia, Moldova, and Ukraine, which are part of the Eastern Partnership neighbouring the EU, as well as Tunisia and Jordan, which are part of the European Mediterranean Partnership (eTwinning, 2022). Turkey joined the eTwinning network in 2009. Despite this, Turkey had the highest number of teacher members with a rate of 53.68% between 2017-2019. This rate was 2.13% in Germany during the same period. In 2019, 298 schools from Turkey took the first place in the community by receiving the eTwinning School Labels, while 4 schools from Germany received them (eTwinning Activity Booklet, 2019).

With publishing the Digital Competence Framework, the EU has specified the digital competencies that its citizens should have, and, in other words, emphasized the importance of digital literacy. The EU attaches importance to the development of digital literacy of its citizens and encourages member states in this regard (Couto, Lucas, Brites & Pereira, 2018). eTwinning projects are a platform that supports communication in foreign languages, digital and social competences, as well as interpersonal and intercultural competences (Vuorikari et al., 2011). The most notable factor in the success of a project on the eTwinning platform is the digital literacy levels of the teachers working in that particular project. In fact, the success of the projects largely depends on the teachers' adequate digital literacy levels so that they can participate in online activities, find partners, and carry out activities in eTwinning projects. Although Turkey was included in the eTwinning network in 2009,

today it ranks first in terms of the number of schools, teachers, and projects among the members of the community. According to 2021 data, there have been 49,572 projects, 282,944 teachers and 51,730 schools from Turkey on this platform, while Germany, one of the strongest members of the EU, has had 12,943 projects, 29,621 teachers, and 10,048 schools. The digital literacy levels of teachers are very important in the execution and successful conclusion of eTwinning projects. The reason why Turkey ranks first in terms of the number of participating teachers, schools, and projects may be that the digital literacy levels of the teachers participating from Turkey is high. From this point of view, it is very important to compare the digital literacy levels of teachers working in Turkey and EU member states. Despite the fact that eTwinning projects involve thousands of schools and teachers, very few academic studies can be found in the literature on eTwinning projects and teachers' digital literacy levels.

The present study has aimed to determine the digital literacy levels of teachers working in Turkey and other member countries on the eTwinning platform. In addition, it has attempted to reveal the effects of eTwinning projects on students, teachers, and schools. Qualitative and quantitative methods have been used concurrently; through the quantitative method, answers have been sought to the following research questions in order to determine the digital literacy levels of teachers who carry out eTwinning projects in Turkey and EU member countries:

- What are the digital literacy levels of teachers working in the EU and Turkey?

- Is there a statistically significance in the digital literacy levels of teachers working in the EU and Turkey by gender?

The qualitative aspect of the research attempted to determine the contributions of eTwinning projects to teachers' professional development, level of technology use, and digital competencies, as well as to the spread of a European culture, and to students and educational environments.

METHOD

Research Design

This study employed a mixed-methods research design, described by Teddlie and Tashakkori (2015: 4) as an alternative scientific method, in which qualitative and quantitative research are used together. The convergent-parallel approach was used in the qualitative dimension of the study. Both quantitative and qualitative data are collected simultaneously in the convergent-parallel approach and the data is analysed separately and then combined. In such a research design, equal importance is given to both types of data (Creswell, 2018: 193).

Relational survey model was used in the quantitative dimension of the study. This model is an approach that aims to describe a past or present situation as it is (Fraenkel & Wallen, 2003; Karasar, 1999). The differences between the digital literacy levels of teachers as to the gender variable were examined by using the relational survey method in the quantitative research.

In the qualitative dimension of the research, a "case study" was used to reveal the opinions of teachers about eTwinning projects. Case studies are in-depth studies that take advantage of multiple data collection sources (interviews, observations, documents, and reports) that have integrity within a certain period of time and that individuals, events and processes are handled as a whole (Creswell & Plano Clark, 2007; Yıldırım & Simsek, 2011; Yin, 1984).

Research Group

The sample group consisted of teachers who had participated in eTwinning projects in Turkey and the EU, as well as those teachers who were project managers. The qualitative and quantitative data of the research were collected online using Google Forms in the 2020-2021 academic year. Figure 1 shows the demographic data of the teachers who participated in the quantitative dimension of the study.
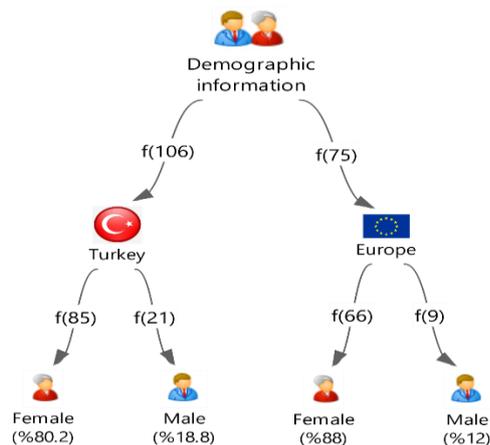
Figure 1. *Demographic data of the teachers who participated in the quantitative research*

The study included a total of 181 teachers, 106 from Turkey and 75 from Europe. Of all the participating teachers from Turkey 21 were male, while 85 were female. Of all the teachers participating from Europe, 9 were male, whereas 66 were female.

In the qualitative research, 47 teachers from Turkey and 62 teachers from the EU presented their opinions. Apart from Turkey, the other countries from which the teachers participated were as follows: Albania (2), Austria (1), Belgium (1), Bulgaria (3), Croatia (1), Czechia (1), Germany (2), Greece (4), Italy (6), Jordan (2), Latvia (2), Malta (1), North Macedonia (1), Poland (2), Portugal (4), Moldova (1), Romania (23), Slovenia (2), and Ukraine (3). In conducting the study, the researcher employed the purposive sampling, which is a method that allows in-depth study of situations that are believed to involve rich information (Patton, 1987). The diversity of the people in the group who would be a party to the problem was attempted to be maximized by using the maximum diversity method in addition to the purposive sampling (Yıldırım & Şimşek, 2011). In order to achieve this, the teachers were accessed through social media groups created about eTwinning projects and forum pages at https://www.etwinning.net. The aim here was to reveal the issues that may arise from province, country and city differences. The teachers participating in the research from Turkey were coded as T1, T2,…., T47, while the teachers participating from the EU member countries were coded as E1, E2,……, E62. Figure 2 shows the demographic data of the teachers.
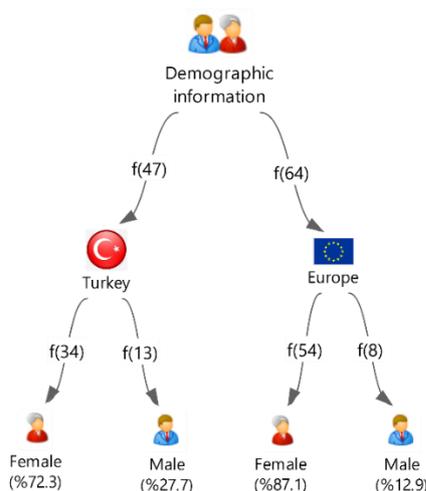
Figure 2. *Demographic data of the teachers who participated in the qualitative research*

As can be seen in Figure 2, 47 teachers, 34 of whom were female and 13 were male, participated in the qualitative dimension of the study from Turkey, whereas 62 teachers, 54 of whom were female and 8 of whom were male participated from the EU member countries.

Data collection tools

The quantitative and qualitative data were collected simultaneously in the study, in which a total of 111 teachers participated in the qualitative dimension, while 181 teachers participated in the quantitative. Necessary permissions were obtained from the scale owner prior to the data collection.

Quantitative data collection tools

The *Digital Literacy Scale*, developed by Ng (2012), was used to collect the quantitative data. The teachers working in the EU member countries were administered the English version of the scale developed by Ng (2012), whereas the teachers participating from Turkey were given the one developed by Hamutoğlu, Güngören, Uyanık, and Erdoğan (2017), who adapted the same scale into Turkish. The scale consists of 20 items and four factors (attitude, technical, cognitive and social), with a 5-point Likert rating ranging from Strongly Agree (5) to Strongly Disagree (1). There are 7 items in the attitude sub-dimension, in which the lowest score to be obtained is 7 and the highest 35. There are 6 items in the technical sub-dimension, where the lowest score to be obtained is 6 and the highest 30. There are 2 items in the cognitive sub-dimension, with the lowest score of 2 and the highest 10. There are 2 items in the social sub-dimension, with the lowest score of 2 and the highest 10. High scores received from the scale and its sub-dimensions indicate high digital literacy. The internal consistency coefficient is .93 for the overall scale, yet it is .88 for Attitude, .89 for Technical, .70 for Cognitive and .72 for Social sub-dimensions.

Qualitative data collection tools

The relevant data were collected using semi-structured interview forms prepared through Google Forms. With the interview forms, the researcher can get more detailed information about the questions, ask additional questions, make quick analyses, and make comparisons by asking the questions prepared beforehand (Büyüköztürk, Çakmak, Akgün, Karadeniz & Demirel, 2012; Türnüklü, 2000; Yıldırım & Şimşek, 2011). While preparing the interview form and questions, open-ended questions that could be easily understood were chosen as much as possible in order to prevent misunderstandings, and avoid directions that followed a logical order (Yıldırım & Şimşek, 2011).

The interview questions were prepared with four teachers who had previously participated in eTwinning projects. The expert opinion of two academicians working in the field of educational sciences was sought on the academic relevance of the prepared questions. The questions were rearranged in line with the expert opinion. The questions were checked by a Turkish Language and Literature teacher and an English teacher in terms of their compatibility with Turkish and English grammar. Open-ended questions were selected in order not to have short answers as Yes/No so that the answers would reflect the real opinions. The questions are listed below:

- Do you think that eTwinning projects contribute to your use of technology? Why/Why not?

- Do you think that eTwinning projects contribute to your pedagogical methods and techniques? Why/Why not?

- Do you think that eTwinning projects contribute to cooperation and communication between schools, and to a European culture? Why/Why not?

- What kind of impact do you think eTwinning projects have on students? Why?

Data collection process

The research data were collected from the teachers accessed through social media groups about eTwinning projects as well as the forum pages at https://www.etwinning.net. The data in the study were collected between April-May 2021.

The teachers participating in the research were explained the purpose of the research, and informed that the results would only be used for scientific purposes and that their identities or any private information to indicate their schools would not be included, and pseudonyms would be used instead of the teachers' real names.

Data Analysis

Analysis of the quantitative data

Descriptive statistics were used to determine the digital literacy levels of the teachers participating in the present research. Kolmogorov-Smirnov test results were examined to decide whether the data were normally distributed; as a result, the significance value was found $p<0.05$. Also, non-parametric Mann-Whitney U test was applied as the number of male participants in the gender variable was less than 30. The data was analysed by using the SPSS.21 package software. Research hypotheses were interpreted at a confidence interval of 0.95 ($p=0.05$).

Analysis of the qualitative data

The preparation and organization of data consists of steps such as coding, association between codes, creating themes, interpreting and presenting the results as a discussion (Creswell, 2013). Themes and codes are created from the edited data, followed by the interpretation of the data. Direct quotations from the participants are frequently included, cause-effect relationships are established and themes are made more meaningful in the interpretation of the data (Yıldırım & Şimşek, 2011).

In the present study, the data obtained from the teachers participating in the eTwinning projects were transferred to a Microsoft Word file and descriptive analysis was carried out. The data were processed according to the thematic framework, and insignificant data were excluded from the study upon making meaningful and logical arrangements. Utmost attention was paid to ensure that the data were readable and understandable while describing the data. Codes were created according to the themes specified, and comments were made in accordance with the purpose of the research. The data analysis was conducted in the MaxQDA 2020 qualitative data analysis program.

Ensuring validity and reliability

In scientific research, it is of great importance that the facts are represented correctly, that they are consistent, objective, and impartial, and that validity and reliability are ensured (Yıldırım & Şimşek, 2011). Table 1 shows the efforts to ensure the validity and reliability of the current study.

Table 1. *Validity and Reliability Process*

Measure		Methods
Validity	Credibility	Expert review
		Participant confirmation
	Transferability	Detailed description
		Purposive sampling
Reliability	Consistency	Consistency analysis
	Confirmability	Confirmation analysis

As a result of the interviews, a framework was created to determine under which themes the data would be presented. For this purpose, the data were coded separately by an academician and a teacher, who was also an eTwinning project manager, in order to determine under which themes the data were included. The codes involving agreement and disagreement were then identified to explore the rate of agreement. The reliability formula of Miles and Huberman (1994) was used to determine the agreement rate (Reliability Formula: Agreement/(Agreement + Disagreement) x 100), which was found over 90%. When the ratio is over 90%, it is an acceptable level to ensure reliability (Saban, 2008). Given that rate, it was concluded that similar results were obtained in the analyses and that the results were reliable.

As it is well known, one of the most important criteria in research is the credibility of the study results (Başkale, 2016). In terms of validity and credibility of the research, the entire study and the data obtained were sent to an academician working in the field of educational sciences so that an expert review was obtained. In the dimension of credibility, the findings were sent to a teacher participating from Turkey to receive a participant confirmation about how much those findings matched the topics they had stated during the interview. In order to ensure validity in the dimension of transferability, direct quotations were included in the findings section in such a way that the statements of the participants were presented as they were. Moreover, the teachers involved in eTwinning projects in different provinces and countries were included in the study by using the purposive sampling method in the dimension of transferability. Finally, in the reliability dimension of the research, the data obtained through Google Forms were converted into Microsoft Excel format and kept by the researcher for confirmation review.

Ethic

All ethical principles were taken into consideration in this study. Ethical permission of the research was obtainedfrom the Human Research Ethics Committee of Zonguldak Bülent Ecevit University (Date and Protocol Number:26/02/2021-64)

FINDINGS

Quantitative analysis results

Table 2 shows the descriptive statistics regarding the digital literacy levels of the teachers participating in the present research.

Table 2. *The arithmetic means of teachers' digital literacy levels*

Factors	Europe						Turkey					
	N	Min.	Max.	$\overline{X}$	Ss	Point	N	Min.	Max.	$\overline{X}$	Ss	Point
Attitude	75	3.00	5.00	4.60	.51	I agree	106	2.86	5.00	4.67	.46	I agree
Technical	75	2.67	5.00	4.24	.63	I agree	106	3.00	5.00	4.33	.55	I agree
Cognitive	75	3.00	5.00	4.34	.65	I agree	106	2.50	5.00	4.32	.61	I agree
Social	75	2.50	5.00	4.24	.64	I agree	106	2.00	5.00	4.19	.76	I agree
Digital Literacy	75	3.00	5.00	4.40	.48	I agree	106	3.12	5.00	4.45	.43	I agree

As shown in Table 2, the responses of the teachers working in the EU member countries to the Digital Literacy scale presented the following results with respect to the mean scores: Attitude ($\overline{X}$=4.60), Technical ($\overline{X}$=4.24), Cognitive ($\overline{X}$=4.34), Social ($\overline{X}$=4.24), and Digital Literacy-General ($\overline{X}$=4.40). On the other hand, the responses of the teachers working in Turkey to the Digital Literacy scale presented the following results with respect to the mean scores: Attitude ($\overline{X}$=4.67), Technical ($\overline{X}$=4.33), Cognitive ($\overline{X}$=4.32), Social ($\overline{X}$=4.19), and Digital Literacy-General ($\overline{X}$=4.45). The digital literacy levels of the teachers in the scale and its sub-factors are at the point of "I agree". The digital literacy levels of teachers from Turkey ($\overline{X}$=4.45) were found higher than those from the EU ($\overline{X}$=4.40).

Table 3 presents the Mann-Whitney U test results regarding the difference between the digital literacy levels of teachers from the EU member countries and those in Turkey by gender.

Table 3. *Mann-Whitney U test results in relation to gender and digital literacy*

Country	Dimension	Gender	N	$\overline{X}$	Rank Total	U	p
Europe	Digital Literacy	Male	9	38.39	345	293	.95
		Female	66	37.95	2504		
Turkey	Digital Literacy	Male	21	58.57	1230	786	.39
		Female	85	52.25	4441		

As can be seen in Table 3, no significant difference was found between the digital literacy levels of the teachers either in the EU [U=293; p>.05] or in Turkey [U=786; p>.05] by gender.

Qualitative analysis results

The data related to the opinions of the teachers participating from Turkey and those from the EU about eTwinning projects were subjected to content analysis, and the MAX Maps codes of the themes obtained are shown in Figure 3.
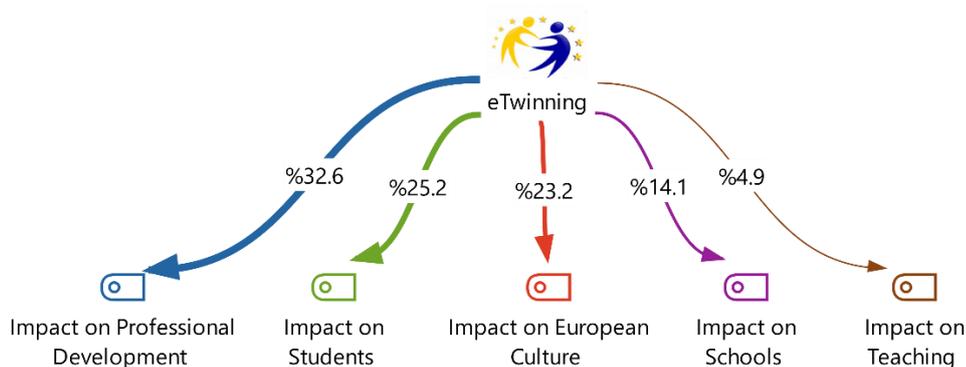
Figure 3. *MAX Maps codes for the eTwinning Project Themes*

Five themes were created as a result of the analysis of the data obtained from the teachers. Of all the five themes, the Professional Development dimension constituted 32.6%, the Impact on Students 25.2%, the Impact on European Culture 23.2%, the Impact on Schools 14.1%, and the Impact on Teaching 4.9%.

Figure 4 illustrates the MAX Maps codes for the theme of Impact on Professional Development.
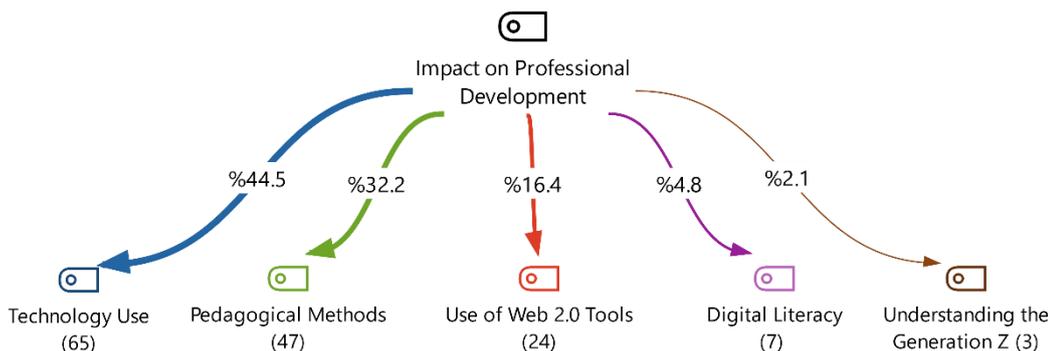
Figure 4. *The MAX Maps codes for the theme of Impact on Professional Development*

Of all the codes formed under the theme of Impact on Professional Development, 44.5% represent technology use, 33.2% pedagogical methods, 16.4% use of Web 2.0 tools, 4.8% digital literacy and, 2.1% understanding the Generation Z. The teachers participating in eTwinning projects stated that the projects contribute to them in terms of using technology at the highest rate. The teachers who participated in the research expressed their views on the codes as follows:

".....in our projects, we use many Web 2.0 tools, ranging from copying pictures to making videos and animation programs (T2). ….Since taking part in the eTwinning projects, I have learned about Web 2.0 tools, which I knew nothing about, and now, we are using technology at every stage. I spend most of my time in front of the computer. I follow the latest technologies (T3). …. I think it contributes a lot to my use of technology. Even just for this reason, I can continue to take part in an eTwinning project. Along with eTwinning, I became aware of many Web 2.0 tools. Especially such programs encouraged me to use technology more (T6). …. eTwinning projects encourage the inclusion of Web 2.0 tools at every stage, and we make use of technology (T9). ...Technology use, methods for teaching, learning and evaluate (E24). ...Collaboration, new ICT tools, international student interaction (E27). ...Technology use, methods, and techniques (E31). ...New methods and techniques, technology use, and ICT use (E44)."

Under the pedagogical development code, 32.2% of the teachers stated that eTwinning projects make considerable contributions in many respects.

"...Thanks to the projects, we research and learn new ways and methods for both personal and professional development (T11). ...I have discovered that the methods suggested to be used by different partners during the projects are also beneficial for myself (T15). ...For example, we prepared and filmed a drama show in our project. In this way, I saw that I was able to reveal the hidden strengths of the students (T18). ...We use discussion and other methods effectively in our project (T47). ...We use new pedagogical methods and techniques, and technology (E17). ...New Pedagogical methods, student and teacher interaction, and collaboration (E61)."

Of all the teachers participating in the research, 4.8% stated that eTwinning projects contribute to their digital literacy levels.

"...projects increase the rate of technology literacy and contribute to technology-based teaching of lessons (T32). ...Technology and internet safety (E20). ...I also promoted media literacy skills (E33)."

Of all the teachers participating in the research, 2.1% indicated that eTwinning projects contribute to their understanding of the Generation Z.

"...eTwinning projects open up a colourful world for teachers that appeal to the children of the Generation Z, rather than simply entering the classroom and using the current curriculum (T2). ...What's more, I can keep up with my students (Generation Z) growing up in the digital age (T15). ...eTwinning projects are useful in attracting the attention of the Generation Z to lessons (T31).

The MAX Maps codes for the theme, namely, the Impact on Students of eTwinning projects are given in Figure 5.
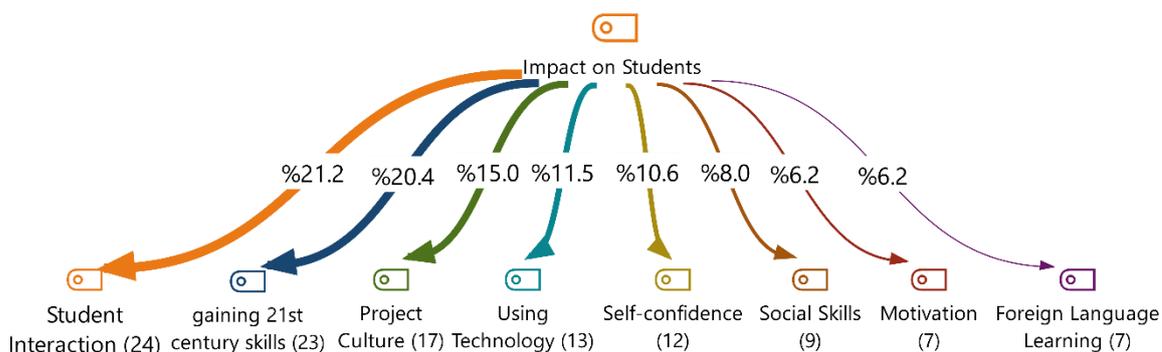
Figure 5. *The MAX Maps codes for the theme of Impact on Students*

Of all the codes formed under the category of Impact on Students, 21.2% refer to student interaction, 20.4% to gaining 21st century skills, 15.0% to project culture, 11.5% to using technology, 10.6% to self-confidence, 8.0% to social skills, 6.2% to motivation, and 6.2% to foreign language learning.

"...Students participating in eTwinning projects not only enjoy them a lot, but also gain new knowledge and make new friends (T4). ...Giving my students the opportunity to work with other students. Meeting other teachers who taught me so much (E6). ...My contribution resumed in student interaction, internationalization, communication (E33)."

Regarding the aspect of eTwinning projects providing students with the 21st century skills, the teachers said "*...projects develop students' digital competence, problem solving, project creation and maintenance skills (T12). ....projects increase students' teamwork skills, technology literacy, sociability and self-confidence skills (T16). ...they can work in cooperation with other students from different schools, develop skills such as creativity and self-expression, and gain self-confidence (T21). ...they boost creativity, language development, correct use of technology, communication, responsibility and teamwork skills (T31). ...they become more eager, curious, proactive, and their willingness to take responsibility increases (T32). ...the students have shown improvement in their ability to produce a common product by doing research in group work, helping each other, and taking responsibility in a collaborative manner (T3, T4, T5, T6, T8, T11, T12, T13, T14)*".

In the present study, 15% of the teachers stated that eTwinning projects contribute to students gaining the project culture.

"...I think that production and developing a project culture contributes to my students in many ways such as research, communication, planning, and duty awareness (T1). ...projects contribute to the problem identification, solution and group work (T12). ...some students were worried at the beginning of the project. Later, the worries disappeared and they joined the project. The project contributed to their self-awareness (T18). ...the project has made the students feel that they are part of the team and that they are valuable (T47). ...the project improved the students' ability to work together, participate in group activities and produce common products (T6). ...Cooperation, digital tool proposals, and creating final products (E16). ...STEAM, interschool cooperation (E34)."

In addition, 11.5% of the teachers participating in the research mentioned that eTwinning projects improve students' use of technology skills.

"... thanks to the projects, children are able to actively use technology in a positive way (T45). ...projects develop students in terms of technology (T11). ....projects contribute to the development of students' technology literacy and socialization skills (T16). ....projects contributed to students' active use of technology and Web 2.0 tools (T41). ....the project developed students' ICT skills (E10). ....technology use and ICT use (E60).

Moreover, 10.6% of the teachers participating in the research pointed out that eTwinning projects help improve students' self-confidence.

"...the student-centred nature of the eTwinning projects enables them to develop self-confidence (T12), ...projects contributed to the development of students' self-confidence and self-expression skills (T10), ...with the project, students' teamwork skills, technology literacy skills, sociability and self-confidence have increased (T16). ...students can work collaboratively with other students from different schools, develop skills such as creativity and self-expression, and gain self-confidence (T21). ...Projects with European partners provide morale and motivation for my students. Foreign teachers and students attract their interest. The products we create make our students happy, and improve their self-confidence, as well (T29). ...students had difficulty expressing their ideas before participating in the projects. However, after taking part in the project, they ended up being able to express themselves (T46)."

In the current study, 8.0% of the teachers emphasized that eTwinning projects positively affect students' social skills.

"...eTwinning projects have developed students' communication skills in social terms. They also contributed to students introducing themselves and establishing friendships (T2). ....working with different schools and countries contributed to the development of students' social skills (T9). ...during the project, not only students' teamwork skills and technology literacy develop, but their sociability and self-confidence also increase (T16). ...with the effect of technology and internet age, students who live away from sociality get together in eTwinning projects, produce common products, and socialize (T18)."

In the present research, 6.2% of the teachers stated that eTwinning projects positively affect students' motivation.

"...they like to do the same things with their peers they have never met, so their motivation increases (T15). ...the students tend to become more curious and willing in their project work (T43). ...the students involved in the projects are curious and proactive, and their willingness to take responsibility is increasing (T32). ...applying the new things that they learned in the projects makes them more willing to learn and boosts up their motivation (T30). ...the projects provide morale and motivation for my students. Foreign teachers and students attract their interest. The products we create make our students happy and improve their self-confidence as well (T29)."

Likewise, 6.2% of the teachers participating in the research stressed that eTwinning projects contribute to students' foreign language learning capacity.

"...especially in projects with foreign partners, students communicate with other students in other countries by writing and speaking, which contributes to their foreign language learning (T15). ....my students participate in activities where they can actively use the foreign language they have learned, and they can work in cooperation with students from different schools (T21). ...the projects contribute to foreign language development (T39)."

Figure 6 presents the MAX Maps codes for the theme of eTwinning projects' Impact on the European Culture.
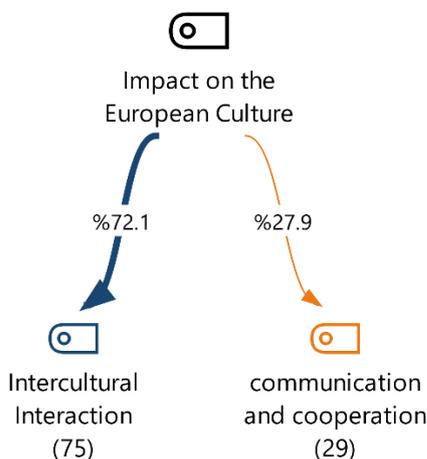
Figure 6. *The MAX Maps codes for the theme of Impact on the European Culture*

Of all the codes formed under the theme of Impact on European Culture, 72.1% of them are related to intercultural interaction, while 27.9% refer to communication and cooperation.

"....eTwinning projects have enabled us to understand the cultures of schools in different provinces in our country, as well as to get to know children in different countries and establish cultural ties in international projects (T2). .... In our projects with foreign partners, we get the opportunities to

get to know different cultures and their special days. We celebrate each other's special occasions (T11). ....eTwinning projects have contributed to inter-school cooperation and communication, as well as to the European culture. We became like a family of 10 teachers working in different cities. We put our children to sleep and work on the project at night. We have a great interaction (T8). ...cooperating is very important. You find out who is doing what, what is being taught in those schools and how it is taught. It changes your culture, your perspective (T14). ....I think that especially the projects with foreign partners improve the foreign language communication skills of the students. I also believe that even if they cannot go and see in person, at least they develop their sophistication by writing, speaking, and seeing (T15). ....in our project, different scenes of a play were acted, recorded, and brought together by students in different countries. Each country designed the scenes according to their own cultures. In this way, the common aspects and differences of cultures became apparent (T18). ....it is a great contribution to learn and use new methods and techniques, to internalization, and to students and teachers' interaction and communication (E1). ....European culture, student interaction (E7), ...More European cooperation (E9), ...Pedagogical methods, development of students' ICT skills, cooperation, communication, intercultural awareness (E10), ...pedagogical methods and techniques, technology use, inter-school cooperation, communication, internationalization, European culture, student interaction (E17), ...digital communication, making friends, getting to know different European cultures, improvement of interaction among students (E43), ...communication with teachers from other countries to share different views how to make lessons interesting, fun and interactive (E18), ...my contribution resumed in student interaction, internationalization, communication and European culture. I also promoted media literacy skills (E33). ....new Pedagogical methods, student and teacher interaction and collaboration, communication skills (E61).

Figure 7 shows the MAX Maps codes for the theme of eTwinning projects' Impact on Schools.
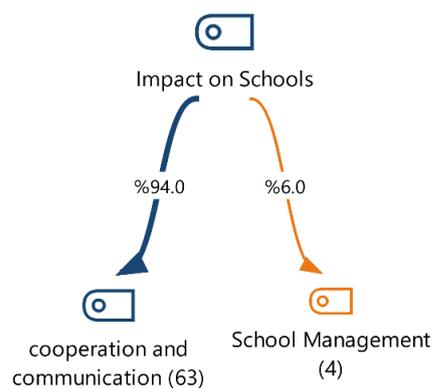
Figure 7. *The MAX Maps codes for the theme of Impact on Schools*

Of all the codes formed under the category of Impact on Schools, 94% of them were related to cooperation and communication, while 6.0% to school management. The teachers participating in the research stated that eTwinning projects contribute to communication, cooperation and school management between schools, both nationally and internationally.

"....we got the chance to understand the cultures of schools in different provinces in our country, as well as to get to know children from different countries and establish cultural ties in international projects (T2). ....we have seen a lot of cooperation, communication, and intercultural interaction. It's great to cooperate and collaborate. We interact with teachers and students from a city at the far end of Turkey, in the same way with foreign countries. It affects both the teachers and the students positively (T30). .... at least two schools need to come together to carry out a project. In this way, inter-school cooperation and communication increases (T31). ....Inter-school cooperation (E12), ...inter-school cooperation, communication, internationalization, student interaction, school management (E17), ...communication with teachers from other countries to share different views on how to make lessons

interesting, fun, and interactive (E18), ...Erasmus plus inter-school cooperation, school education, student interaction (E41), ...communication, internationalization, student interaction, school management (E42)."

Figure 8 illustrates the MAX Maps codes under the theme of eTwinning projects' Impact on Teaching.
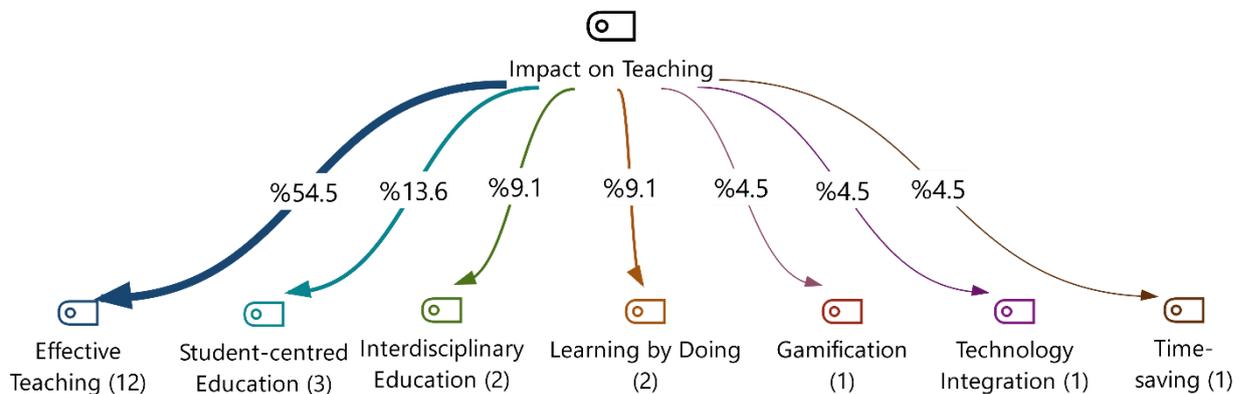
Figure 8. *The MAX Maps codes for the theme of Impact on Teaching*

Of all the codes formed under the category of Impact on Teaching, 54.5% of them were related to effective teaching, 13.6% to student-centred education, 9.1% to interdisciplinary education, 9.1% to learning by doing, 4.5% to gamification, 4.5% to technology integration, and 4.5% to time-saving.

The teachers participating in the research stated that eTwinning projects contribute to effective teaching in classrooms.

"....I specially use the most common Web 2.0 tools and other technological tools. In this way, I can teach more effectively (T15). ....eTwinning projects contribute to the development of learning skills, which is reflected positively on the lessons (T22). ....the lessons are more effective, active and interactive thanks to the projects (T21). ....Great contribution to learn and use new methods and techniques, internalization, students and teachers' interaction and communication (E1), ...Communication with teachers from other countries to share different views how to make lessons interesting, fun, and interactive (E18)."

The teachers participating in the research indicated that the projects apply the interdisciplinary and student-centred principles of teaching such as gamification and learning by doing, and these practices contribute to the increase in students' self-confidence. They further stated that such practices provide technology integration and save time.

"...We include student-centred practices in eTwinning projects, which increases students' self-confidence (T12). ....while preparing lesson plans, we make interdisciplinary and student-centred designs (T16). ... during the project activities, students learn by doing (T30). ....especially throughout the distance education period, I helped the students to learn through questionnaires, quizzes, and gamification in accordance with the themes (T2). ....I can teach my lessons more effectively, especially by using the Web 2.0 tools and other technological tools. I also save time by using those applications (T15). ...the main expectation while running the project is the integration of technology into education. We can achieve them through the projects. We come together with students from different provinces and schools, and take advantage of technological opportunities in the execution of project studies. Also, our proficiency in using technology increases (T1)."

DISCUSSION, CONCLUSION, RECOMMENDATIONS

The current study attempted to determine the digital literacy levels of the teachers who carry out eTwinning projects in Turkey and the EU, and to reveal the effects of eTwinning projects on cooperation between students, teachers, and schools. The research was conducted using qualitative and quantitative data. The quantitative data were used to determine the digital literacy levels of teachers, while the qualitative data obtained from interviews with teachers were used to identify the effects of eTwinning projects on students, teachers, and schools.

The results of the research show that the views of the teachers working in Turkey and the EU regarding their digital literacy levels are at the level of "I agree". In this respect, it could be assumed that the digital literacy levels of teachers working in Turkey and the EU are high. In particular, the comparison between the digital literacy levels of the teachers working in Turkey and the EU revealed that the digital literacy levels of the teachers working in Turkey are higher than those working in the EU.

With the Digital Competence Framework for Educators (DigCompEdu) published in 2017, the EU defined 22 common competencies in 6 areas that educators should have (Redecker, 2017). The EU also continues to carry out monitoring and evaluation activities to ensure that teachers in member countries possess the specified competencies. In a similar manner, the Movement of Enhancing Opportunities and Improving Technology (FATIH) project was initiated in Turkey in 2010. This project aimed to provide hardware and software infrastructure to all classes, to prepare educational e-contents, to provide teachers with in-service training so that they could use ICT effectively, safely and consciously in teaching programs. In this context, teachers were regularly provided with in-service trainings.

As of 2021, within the scope of that project, 474,991 interactive whiteboards, 13,800 school-specific VPN connections, and 667,157 tablets and computers were distributed to 24,428 schools. In addition, a total of 963,179 teachers were provided with in-service training - 421,164 teachers with face-to-face training, whereas 541,505 teachers with distance training (Fatihprojesi, 2022). The reason for the high digital literacy of teachers working in Turkey and the EU in the study may be due to the FATIH project and DigCompEdu applications.

In the literature, most of the academic studies on digital literacy in Turkey appear to have been conducted with preservice teachers, yet the studies conducted with teachers are very few. Given the results of the studies conducted with classroom teachers in Turkey, it was found that the digital literacy levels of classroom teachers are high (Aksoy, Karabay & Aksoy, 2021; Korkmaz, 2020). Similar results were obtained in studies conducted with preservice teachers; and they reported the digital literacy levels of preservice teachers as high (Boyacı, 2019; Karakuş & Ocak, 2019; Kozan & Özek, 2019), good (Üstündağ, Güneş & Bahçivan, 2017), and moderate (Yontar, 2019).

In a study conducted with English teachers in Japan, teachers stated that they use digital technologies in their lessons and are willing to improve their digital literacy levels (Cote & Milliner, 2018). Another study conducted on teachers' digital literacy in Poland concluded that the teachers in that study had the lowest knowledge about copyright (Tomczyk, 2019). In a study in Czechia, researchers concluded that digital literacy levels of classroom teachers are not sufficient for teaching mathematics (Nocar, Dofková, Pastor & Laitochová, 2019). A study on digital literacy in primary schools in Slovenia reported that teachers play a significant role in the development of students' digital literacy. Another study indicated that motivation, knowledge and skills, teacher training, ICT knowledge, peer support, and lifelong learning are effective in the competence of teachers in digital literacy (Uršej, 2019).

The literature review on studies conducted on digital literacy reveal certain differences between countries. Such differences may result from teachers' ICT competencies. eTwinning projects may

contribute to the elimination of the discrepancies and to the development of teachers' digital literacy since eTwinning projects support cooperation between schools and countries, and the use of the ICT.

In the present study, no statistical difference was found between the digital literacy levels of teachers working in the EU and Turkey by gender. Likewise, in the literature, a study conducted with classroom teachers found no difference between the digital literacy levels of male and female teachers in (Aksoy, Karabay & Aksoy, 2021), while another study concluded that male teachers' digital literacy levels were higher than those of female teachers (Korkmaz, 2020). In some other studies conducted with preservice teachers, the results support our research findings (Kozan & Özek, 2019; Karakuş & Ocak, 2019). Apart from those findings, there are studies in the literature in which the digital literacy levels of male preservice teachers were found higher than those of female preservice teachers (Sakallı, 2015; Özerbaş & Kuralbayeva, 2018; Özgür, 2016; Yontar, 2019), yet there are other studies in which female preservice teachers were found to have higher digital literacy levels than male preservice teachers (Boyacı, 2019). Some studies in the literature support our results regarding the teachers' gender and digital literacy levels, but some do not. The reason for this difference may be due to the differences in male and female teachers' digital competencies, as well as their fields, schools, and the applied curricula.

As a result of the analysis of the qualitative data of the research, five categories emerged as Professional Development, Impact on Students, Impact on European Culture, Impact on Schools, and Impact on Teaching. The teachers participating in eTwinning projects stated that the projects have the greatest impact on their professional development, and then on students, European culture, schools and teaching, respectively.

The results show that eTwinning projects contribute to the professional development of teachers in terms of the use of technology, pedagogical methods, use of Web 2.0 tools, digital literacy and understanding the Generation Z. With eTwinning projects, teachers not only produce digital content using Web 2.0 tools, but they can also combine pedagogical knowledge with technology. The projects also facilitate communication between teachers and students of the Generation Z. eTwinning projects play a motivating role in terms of teachers' communication with digital native students (Camilleri, 2016). They also provide professional development opportunities for teachers (Vuorikari, et al. 2011) and integrate Web 2.0 tools into social networks (Crawley, Gerhard, Gilleran & Joyce, 2015). Such projects enable students and teachers to acquire the competences specified in the European Digital Competence Framework and digital literacy (Carretero, Vuorikari & Punie, 2017; European Commission, 2019; Papadakis, 2016). The main aim of eTwinning projects is to improve inter-school cooperation in Europe and ensure continuing online professional development opportunities for educators by providing support, tools, and services for schools through the use of the ICT. As a result of the present research, we can assume that teachers have achieved the targets, as specified by eTwinning projects.

The teachers participating in the research emphasized that eTwinning projects tend to have positive effects on students in such a way that the interaction among students increases and students gain 21st century skills, develop a project culture, use technology more, develop self-confidence, which all, in turn, improve their social skills, increase their motivation, and contribute to foreign language learning. As they make new friends through eTwinning projects, students' social skills develop and they gain problem-solving skills, learn to work and produce together with a team, develop a project culture, and gain ICT skills, their competence in Web 2.0 tools develops and their digital literacy increases (Acar, 2021), their self-confidence improves, and their willingness increases about learning a foreign language. eTwinning projects motivate students and contribute to students' language learning as well as deep learning (Demir & Kayaoğlu, 2021; Fernández & Tena, 2013; Leto, 2018).

The teachers participating in the research further underlined that the projects provide intercultural interaction between students and teachers, develop communication and cooperation, and contribute to the formation of a European culture among them. An eTwinning project can be carried out in collaboration between teachers and students of at least two European schools working with the use of the ICT (Papadakis, 2016). Through the eTwinning platform, teachers establish partnerships, share project ideas (Pham, Klamma & Derntl, 2012), and communicate interculturally. Just as Facebook is a social media platform for getting together with old friends, eTwinning projects meet the need for an international social network where teachers can collaborate by sharing their ideas (Crawley, Gerhard, Gilleran & Joyce, 2015). eTwinning projects raise awareness of students and teachers to be global citizens and to look at the world from a multidimensional perspective (Camilleri, 2016).

The teachers participating in the current study indicated that they were able to develop the communication and cooperation between schools and contribute to school administrations. eTwinning projects are a point of contact for cooperation and communication between teachers and schools all over Europe (Pham, Klamma, & Derntl, 2012), promoting cooperation between schools using the ICT (Vuorikari et al., 2011). eTwinning projects are a key to school-wide collaboration and are cross-curricular e-activities involving language and literacy as well as the ICT skills (European Commission, 2013). eTwinning offers more opportunities for interaction by combining traditional and innovative educational approaches (Komninou, 2010).

The teachers participating in the research also noted that eTwinning projects have positive effects on educational environments. The projects contribute to technology integration in classroom environments, as well as carrying out student-centred teaching in line with a fun, active, living by doing, and interdisciplinary manner. Networks created through eTwinning give teachers the opportunity to collaborate anytime and anywhere (Vuorikari, et al. 2011), increase the quality of classroom education (Hofman, 2010), and contribute to the in-depth learning of students (Fernández & Tena, 2013).

We concluded that the teachers who are involved in eTwinning projects in Turkey and the EU have high digital literacy levels, showing no statistical significance by gender. Moreover, eTwinning projects prove to contribute to the professional development of teachers. They also help teachers develop their skills in using Web 2.0 tools, technology, and pedagogical knowledge together, and facilitates communication with the students of the Generation Z. They enable students to acquire 21st century skills, develop a project culture, improve their use of technology, boost their self-confidence, social skills, and motivation, and ease foreign language learning. They also build communication and cooperation between schools, students, and teachers at national and international levels, bring technology integration into classroom environments, and contribute to the spread of a European culture among them.

Recommendations

The current study is limited to the teachers' opinions. Further studies can be conducted by observing school administrators or in-school practices. The teachers participating in the research were those who carried out eTwinning projects. Future studies can be carried out by classifying teachers according to the school types they work in and their fields of training. Most of the studies are generally based on teacher opinions. Further qualitative studies can be conducted based on student opinions. eTwinning projects are required to be integrated into the education curriculum; consequently, further experimental studies can be conducted to identify the effects on students of eTwinning projects integrated into the education curriculum.

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