

Learning Communities and Teacher Professional Development: The Case of eTwinning Seminars

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Abstract

eTwinning seminars provide in-service teachers with opportunities to develop skills and competences, through teamwork and interaction in an online environment, supporting them to enrich their teaching practices in the classroom and strengthen their self-efficacy. In this article, we present results from the evaluation of eTwinning seminars in Greece, with the aim to investigate how participation obstacles were managed by the trainees, what type of interaction was developed among the trainees, and the extent to which trainees acquired skills which they could apply in their classroom. The study followed a quantitative design, using an online survey with a sample of 753 participants (in-service K-12 teachers). Results indicated that most of the participants have met their expectations and acknowledged the adequacy of the educational material and the professional development opportunities. Moreover, results showed that demographic characteristics had a statistically significant effect on respondents' perceptions and practices.

Keywords

e-Learning, Teachers Professional Development, eTwinning, Learning Communities, Professional Learning Communities

1. Introduction

In the era of globalization and digitization, educational system is constantly subject to changes, which includes utilization of new technological means, the need to expand the school community beyond the narrow boundaries of the school and the need for continuous professional development for all teachers (Whitehouse et al., 2010). Moreover, post-modern education is characterized by flexibility, democratic principles, and a tendency to involve other individuals and social

groups in the educational process. Due to these important changes, teachers should adapt to these new conditions. Adaptation of teachers involves not only teaching practices, but also affects the way and the means that teachers will use to be informed, to develop new knowledge and skills and finally develop themselves in a personal and professional level (Helleve, 2010).

In this context, beyond traditional methods of teacher professional development, online training models like eTwinning seminars, enable teachers to interact with colleagues, exchange ideas and keep up to date. At the same time, training methods are now more active, and each step towards own's development is an experience and not just new information, by utilizing technological means, which allow the organization of fully online seminars (Pateraki, 2018). eTwinning has been used to implement special seminars as learning events between teachers, which are informal, short-term learning opportunities for teachers working together on a specific topic supported by a fellow eTwinning teacher. The objectives of learning events can vary considerably, often focusing on finding applications of specific tools such as ICT and learning to use them during teaching (Holmes, 2013).

In Greece, eTwinning seminars are a quite new initiative aiming to foster teachers' professional development in national level, mainly on the pedagogical use of digital technologies in school practice. The eTwinning seminar under evaluation was organized in five thematic topics (*Learning and Communication, Content Creation and Multimedia Processing, Collaboration and Support, Learning Objects and Learning Communities and Creative and Safe Internet*), had a duration of 6 months with a workload of 120 hours. It was offered in five consecutive cycles in a national level during the period 2019-2020, free of charge to all in-service teachers in Greece, using the Moodle open platform as Learning Management System for the delivery of the seminars.

In this article, we present one of the first studies in Greece that evaluate the implementation of eTwinning training programs, both in terms of how they are implemented (user interaction, problem solving, role of trainers, etc.) and of the effect they have on teachers (change of skills, strengthening the use of ICT, acquisition of new skills, etc.).

2. Theoretical Background

2.1. Teachers Professional Development

Improving teaching and learning requires from teachers to systematically engage in a continuous process of new knowledge and skills acquisition and to develop innovative strategies and practices in the classroom (Carpenter, 2015). In this context, professional development is defined as any activity intended to prepare teachers to improve their performance within school organizations (Little, 1987).

Teacher Professional Development (TPD) is a long-term, coherent, personal, and continuous process related to the professional career of teachers, aiming to enhance students' learning outcomes (Schlager & Fusco, 2003). TPD is the learn-

ing process of teachers, through various training activities, for the transformation of their knowledge into practice, in the direction of enhancing the knowledge and development of their students (Avalos, 2011; Conn, 2017).

Teachers' participation in TPD programs can contribute to the exchange of information with other teachers, experts, or academics to enhance their professional effectiveness. In this sense, through professional development, teachers gradually become upskilled as they share and acquire knowledge and values that enhance their teaching abilities (El-Hani & Greca, 2013), via participation in the following types of TPD initiatives:

- Formal education and training, like postgraduate studies, or non-formal training, like seminars with a curriculum on a specific topic, with predefined duration and learning outcomes. Teachers training usually focus on introducing or exploring new teaching methods, effective classroom management techniques, educational technology tools and methods, etc. (Cirocki & Farrell, 2019).

- Informal education processes, including self-directed training of personal interest and needs, which may include everyday experiences as well as informal discussions with colleagues (Cirocki & Farrell, 2019).

Single-topic professional training programs are the most common format for TPD, where teachers participate in a structured knowledge or skilled-based seminar (Kul, 2018). But this type of standardized training program provides limited opportunities for teachers to collaborate, and they are not so efficient in terms of strengthening the sense of belonging in a “professional community” (Vo & Nguyen, 2010).

Therefore, the achievement of the goal of improving teaching is achieved to a greater extent when teachers participate in networks where they can share their experiences and good practices and collaborate with each other (Lumpe, 2007; Zhao et al., 2019).

2.2. Online Learning Communities

Traditionally the term “community” refers to a group of people who live and act on the same geographical area sharing common aims and values and is differentiated from any other group formation based on 1) core characteristics such as people, common ties and purpose, social interactions, and activity in time/space (Hillery, 1995; Poplin, 1979; Stuckey, 2007), 2) hallmarks such as agency, belonging, cohesion and diversity (Watkins, 2005) and 3) processes within the community such as acting together, dialoguing, collaborating, and bridging (Mendes et al., 2008).

A special case of communities where learning and community are interrelated under the lens of social constructivism is the Learning Community, which is defined as a group of people who share a common goal, work together, gain benefits each other, respect different opinions, promote opportunities for active learning and develop a collaborative environment for empowerment of membership and new knowledge formation (Kilpatrick et al., 2003).

The emergence of Internet and social networking has renewed interest in the so-

cial concept of “community” in supporting online collaboration and peer-to-peer learning. Online Learning Communities (OLCs) are utilized to strengthen the collaboration between teachers-students, teachers-teachers, and students-students, considering motives, success factors, barriers, and various structural characteristics (Kostas & Sofos, 2012). In the field of teacher professional development, OLCs provide valuable opportunities for personalized learning, informal sharing of good practices, and collaborative learning (Avalos, 2011), under the lens of Professional Learning Communities (PLCs).

According to DuFour et al. (2008), a PLC can be defined as a commitment of teachers towards their own professional development through collaboration, as a key to improve students’ learning. Bolam et al. (2005) argue that the characteristics of effective PLCs include supportive leadership, shared goals and values, a collective culture, joint problem solving and collective inquiry about the improvement of teaching, learning and school environment.

Additionally, empirical research shows that teacher interaction in PLCs is related to students’ achievement, and therefore the degree of teacher interaction affects the effectiveness of the educational process (Lam, 2005), while community practice is a framework through which education professionals communicate with each other, to solve problems that arise in their workplace, as well as to improve their skills (Alshehry, 2018).

2.3. eTwinning

The European initiative of eTwinning aims to promote new and innovative ways of using ICT in European schools by encouraging online collaboration between students and teachers. eTwinning is an institutionalized Internet-mediated learning environment and social network, for learning, training and collaboration among students, teachers, and schools in EU through joint project-based activities (Papadakis, 2016).

Virtual learning communities like eTwinning, provide opportunities for virtual learning interaction to more than 350 K teachers in various countries, with the main goal of collaboration in professional learning programs (Halverson, 2018). By providing concrete opportunities to broaden the debate around innovation in the use of ICT for learning and the delivery of pedagogical expertise, networks such as eTwinning contribute to the acceleration of educational change and the diffusion of pedagogical innovation at a system level.

Moreover, engagement of teachers in eTwinning provides them with online tools that support their professional networking, encourage collaboration, and provide opportunities for collaboration through online and/or face-to-face events. In addition, eTwinning influences teaching practices through important activities that strengthen specific skills, such as intercultural awareness and problem solving (Kampylis, Bocconi, & Punie, 2012).

The socio-cultural perspective of eTwinning platform extends the community beyond the physical boundaries of a classroom or school unit, towards an Internet-mediated community of practice. In this way, integrating eTwinning into the

curriculum, requires purposeful and specific interactions across linguistic, cultural, and disciplinary differences. Those interactions among participants reinforce collaborative work between teachers, so embedding the curriculum in a broad community of practice could enhance the development of teachers' practices, and subsequently, their professional development (Gajek, 2017).

3. Literature Review

eTwinning is recognized as a very useful platform by all professionals and stakeholders which, by supporting the continuous professional development of teachers, contributes to the modernization of education, while influences teaching practices through activities that strengthen skills like intercultural awareness and problem solving (Kampylis et al., 2012).

In UK, research by Holmes & Sime (2012) revealed that skills of primary and secondary teachers were enhanced by eTwinning tools, but the effect of the specific action on practical learning, teaching skills, and social interactions was smaller.

Crisan (2013) stated that at a practical level, it was difficult to integrate eTwinning into the curriculum, due to the existing gap between the goals of eTwinning and the methods and content of the typical school curriculum in Poland.

Holmes (2013) conducted a study to investigate how an online learning community can support teacher skills development and results showed that eTwinning created a sense of trust, shared values and beliefs, and a sense of reciprocity.

Kearney & Gras-Velazquez (2015) in their study, found that eTwinning's professional development services are very encouraging, but there is also a need for further development, while eTwinning has a more positive effect on teachers working in innovative schools, compared to teachers working in typical schools.

In Greece, Zandraveli (2017) used a survey research and found that teachers reinforce their formal training with informal and eTwinning training and adopt collaborative and self-regulated learning practices within the context of the community. Teachers capitalize on the learning outcomes by using them in their daily teaching and increasing, in this way, their professional development, their self-education, and their self-satisfaction.

In the same year in Italy, experiences and results from eTwinning learning events were investigated by Cinganotto (2017) in a qualitative study, which revealed that eTwinning can develop a wide range of skills, such as collaboration at work, learning to learn, digital skills, international collaboration, and intercultural awareness.

Finally, in 2018, the impact of eTwinning activities on the development of teachers' practices and skills was investigated in Belgium by Pateraki (2018) who found that most teachers showed significant progress in their skills, while improvement in pedagogical skills was higher than the one in collaboration skills.

From all the above studies, it can be concluded that eTwinning is a very useful

tool for developing skills and is an innovation recognized by teachers to enhance learning, collaboration, and creative learning.

But at the same time, literature review shows that there is a need to further evaluate eTwinning TPD programs, especially in Greece, because TPD programs describe a wide range of approaches to improve teaching practice, and their evaluation is a benchmark of whether and to what extent, teachers' participation in such programs contributes to better student learning outcomes (Wolf & Peele, 2019).

4. Research

4.1. Aim of the Study

The purpose of this study was to investigate the opinions of primary and secondary teachers who participated in eTwinning seminars in Greece.

More specific, aims of the study include the analysis of participants' opinions regarding the adequacy of the educational material of the seminar, the role of the trainers, the level of expectations met by the teachers, the way of handling questions and problems that arose during the implementation of the seminar, the way of communication with other trainees and the extent to which participants' teaching method and skills were affected after attending the seminar.

4.2. Research Questions

Based on the conducted literature review, the following research questions were formulated, reflecting the objectives of the research carried out:

Q1 Which are the opinions and practices of teachers regarding eTwinning seminars?

Q2 How did communication in the learning community take place?

Q3 How did teachers evaluate their participation?

Q4 How teachers' demographic data influenced eTwinning seminars?

4.3. Tool and Sample

A representative sample design (Creswell, 2011) was utilized as it helps to describe and determine opinions, beliefs and attitudes held by the respondents using a questionnaire. For the purposes of the research, an improvised questionnaire was created primarily based on the literature (Holmes, 2013; Kostas, 2015; Papadakis, 2016; Kostas, Berdekli, & Sofos, 2021).

The tool consisted of 43 questions divided into seven sections:

- Section 1: questions 1 - 9 gather demographic data.
- Section 2: questions 10 - 13 assess various facts for the seminar, like coverage of expectations, study time, seminar days and workload in hours.
- Section 3: questions 14 - 15 assess how problems were managed by the participants in the context of the learning community.
- Section 4: questions 16 - 22 assess the communication and interaction both between trainees and between trainees and trainers.

- Section 5: questions 23 - 33 assesses the extent to which 1) the tools of the seminar could be applied in practice and 2) the teachers used the specific tools.
- Section 6: questions 34 - 39 evaluates eTwinning in terms of educational material, development opportunities, advantages, disadvantages, obstacles, and skills acquired.
- Section 7: questions 40 - 43 documents participants' opinions about the seminar, and suggestions for improvement.

To optimize the survey tool, a pilot study was run on a small sample of participants, as according to Hill (1998), pilot research is considered adequate if it is conducted on a sample of 10 to 30 participants.

Results from the pilot survey helped identify grammatical, syntactical and expression errors. To collect the data, an electronic questionnaire (Google Form) was created (with most of the questions in sections 2-6 Likert-5 type) and distributed to teachers who participated in the seminars. Data was processed with IBM SPSS v25.

The population of the research was the in-service teachers who participated in the eTwinning seminars since 2020, with 400 e-classes using respectively 400 trainers on a total of approximately 7000 registered teachers. As it was not possible to apply random sampling, convenience sampling was applied (Robson, 2010), with a final sample of 751 in-service teachers.

4.4. Reliability and Validity

To check the reliability and validity of the survey tool, a pilot study was conducted first. For the individual sections of the questionnaire (Sections 2-6), the Cronbach alpha was calculated with values greater than 0.7, which indicates satisfactory validity and internal consistency (Tavakol & Dennick, 2011).

In addition, a face validity check was performed to ensure validity. That is, for each part of the questionnaire, the aim was to represent all possible questions, while for the questions using the Likert scale the aim was to gather all the possible answers that the respondents could give. In any case, the values obtained by the answers have meaning and are considered important because their statistical processing contributes to the answers to the research questions (Creswell, 2011).

5. Results

5.1. Demographics

- The sample consisted of 29.8% (N = 224) men and 70.2% (N = 527) women, while the average age of the sample was 45.5 years, with most of the respondents' age between 47 and 54 years old (39.1%).
- 310 (41.3%) of the respondents had a graduate diploma, 35 (4.7%) had a second graduate diploma, 366 (48.7%) had a master thesis diploma, while 40 (5.3%) had a doctoral thesis.
- 626 (83.4%) of the respondents were in-service teachers and 125 (16.6%) were school administrators, while 615 (81.9%) had a permanent job placement and 136 (18.1%) had a contract.

- 161 (21.14%) of the respondents were in service between 1 to 11 years, 311 (41.4%) between 12 to 19 years and 279 (37.15%) more than 20 years.
- 85 (11.3%) of the respondent were pre-school education teachers, 276 (36.8%) were primary school teachers, 388 (51.66%) were high school teachers and 87 (11.6%) were VET teachers.
- 639 (85.1%) of the respondents were certified by the national qualification program “Use of ICT in Education Level 2”, while 51 (6.8%) were certified by the national qualification program “Use of ICT in Education Level 2—Trainers”.
- Finally, 412 (44.8%) of the respondents stated that they make extensive use of ICT in their teaching, 272 (36.2%) make use of ICT in their teaching occasionally, and 67 (8.9%) make minimal use or no use of ICT.

5.2. Q1 Which Are the Opinions and Practices of Teachers Regarding eTwinning Seminars?

86.8% of the respondents stated that the seminars met their expectations in a great extent (**Table 1**), having to work between 1 to 3 hours per week (90%) and more than 3 hours per week (10%) (**Table 2**), mainly during weekends (**Table 3**) and between 18:00-22:00 (**Table 4**) as all the participants were adult learners working during the day.

Respondents stated that problems were resolved in various ways, i.e., communication with the trainer, with other trainees, with the technical support/management team (**Table 5**), while 569 (75.9%) stated that questions were resolved by the trainers, 567 (75.5%) by other trainees and 268 (35.7%) by the support team.

Table 1. Degree to which the eTwinning seminars met participants’ expectations.

Level ^a	Responses	
	Frequency	%
2	12	1.6
3	87	11.6
4	413	55.0
5	239	31.8
Total	751	100.0

^a4: Fully met—0: Not met.

Table 2. Workload on a weekly basis.

Hours	Responses	
	Frequency	%
1	105	14.0
2	346	46.1
3	225	30.0
>3	75	10.0
Total	751	100.0

Table 3. Working days on a weekly basis.

Days	Responses	
	Frequency	%
Monday	238	26.8
Tuesday	174	19.6
Wednesday	137	18.2
Thursday	109	14.5
Friday	259	34.5
Saturday	433	57.7
Sunday	400	53.3

Table 4. Working hours on a daily basis.

Time Period	Responses	
	Frequency	%
07:00-14:00	59	7.9
14:00-18:00	114	15.2
18:00-22:00	387	51.5
22:00-07:00	191	25.4
Total	751	100.0

Table 5. Modes of support.

Modes of support	Respondents had to choose one of the following options				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Personal communication with the trainer	25.8%	-	48.6%	19.7%	5.9%
Personal communication with trainees	29.7%	-	47.1%	17.7%	5.5%
Personal communication with the support team	43.7%	-	44.7%	8.8%	2.8%
Forum communication with the trainer	18.6%	-	50.2%	22.0%	9.2%
Forum communication with trainees	12.0%	-	45.5%	29.8%	12.6%
Forum communication with the support team	41%	-	44.2%	10.5%	4.3%

5.3. Q2 How Did Communication in the Learning Community Took Place?

In the following tables (**Tables 6-8**) the communication pattern within the community is presented, describing frequency of communication, communication groups size and profile of participants.

Regarding the means used by the participants to communicate, the most frequently used were forum, internal messaging system (Moodle) and email, while Skype and Facebook were used the less by the participants (Table 9).

Moreover, for communication to be effective, 8.9% of the respondents stated that communication means should be used every day, 37.2% believe that the above tools should be used once, or twice a week (34.8%), while fewer teachers argued that the frequency of use should be less often (19.2%).

According to most participants, their trainer was consistent in grading the workshop activities, knowledgeable about the subject, provided constructive feedback, guidance, and encouraged communication (Table 10).

Table 6. Communication frequency between the participants in the seminar.

Communication pattern	Responses	
	Frequency	%
Every day	-	-
2 days per week	115	15.3
1 day per week	178	23.7
1 day per month	300	39.9
Never	158	21.0
Total	751	100.0

Table 7. Group sizes of participants during communications.

Num of Trainees	Responses	
	Frequency	%
0	149	19.8
1	109	14.5
2 - 3	385	51.3
4 - 6	80	10.7
>6	28	3.7
Total	751	100.0

Table 8. Trainees types in communication groups.

Type	Responses	
	Frequency	%
Friends	131	17.4
Colleagues	233	31.0
Other trainees in the same class	350	46.5
Other trainees outside the class	111	14.8
None of the above	136	18.1

Table 9. Communication means in the community.

Mean	Responses	
	Frequency	%
Email	173	23.0
Forum	328	43.6
Moodle messaging	270	35.9
Phone	43	5.7
F2F	25	3.3
Skype	14	1.9
Viber	19	2.5
Facebook	14	1.9
None	15	2.0

Table 10. Trainer activity.

Activity	Respondents had to choose one of the following options				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Trainer was assessing on time	54.9%	36.9%	2.8%	1.7%	3.7%
Trainer was providing constructive feedback	46.3%	38.9%	9.2%	1.6%	4.0%
Trainer had good knowledge of the subject	50.5%	38.3%	6.4%	1.5%	3.3%
Trainer was encouraging the trainees	46.7%	34.5%	11.7%	2.7%	4.4%
Trainer was providing support	44.5%	36.2%	12.5%	2.8%	4.0%
Trainer was encouraging communication	41.1%	34.1%	17.2%	3.2%	4.4%

5.4. Q3 How Did Teachers Evaluated Their Participation?

Respondents stated that their participation in eTwinning seminars mainly provided the opportunity to develop ICT skills (95.5%), basic skills in science and technology (57.1%), ability to learn how to learn (86.7%), and the sense of innovation and entrepreneurship (63.6%), cultural expression and awareness (56%) (Table 11).

Regarding the benefits that eTwinning seminars offered to the participants, the main benefit appeared to be the professional and pedagogical development of teachers (93.5%), increased motivation and improvement of students' learning outcomes (89.9%) and, finally, the development of a culture of cooperation between members in the school units (79.1%) (Table 12).

The main problems faced by the respondents seem to be the lack of ICT infrastructure in the school environment (63%), the lack of official accreditation, recognition and reward of teachers participating in eTwinning seminars (61.1%), the lack of free hours during school (55.6%), the lack of digital skills by teachers (54.1%), and the inflexible curriculum (50.5%) (Table 13).

Table 11. Opportunities for professional and personal development.

Types of development	Respondents had to choose one of the following options				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Readiness and speaking in the mother tongue	12.4	31.3	36.4	12.5	7.5
Speaking in foreign languages	9.1	26.2	37.9	19.2	7.6
STEAM skills	16.8	40.3	29.8	9.9	3.2
ICT skills	50.5	45.0	2.9	0.8	0.8
Social and political skills	13.7	29.0	40.1	12.0	5.2
A sense of innovation and entrepreneurship	23.7	39.9	25.6	8.4	2.4
Learn how to learn	37.4	49.3	9.5	2.4	1.5
Cultural expression and awareness	19.0	37.0	31.4	8.7	3.9

Table 12. Benefits of eTwinning seminars.

Benefits	Respondents had to choose one of the following options				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Increasing motivation and student learning outcomes	35.4	54.5	8.3	1.3	0.5
Professional and pedagogical development of teachers	44.6	48.9	5.7	0.5	0.3
Development of a culture of cooperation between members in school units	35.4	43.7	16.4	3.1	1.5

Table 13. Problems during eTwinning seminars.

Problems	Respondents had to choose one of the following options				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of free hours during school hours	17.8	37.8	16.4	19.2	8.8
Lack of ICT infrastructure in the school	27.8	35.2	16.4	14.6	6.0
Lack of support for teachers from their colleagues	10.4	29.3	27.7	23.0	9.6
Lack of digital skills by teachers	15.0	39.1	27.3	12.9	5.6
Existence of detailed and inflexible curriculum	17.3	33.2	25.2	17.2	7.2
Lack of official accreditation, recognition and reward of teachers participating in eTwinning seminars	30.1	31.0	20.6	11.5	6.8

The eTwinning seminar contributed to the acquisition of skills in the use of Web 2.0 tools (79.4%), to the introduction of new techniques in the teaching (77.7%), to the acquisition of confidence as to the ability to manage student groups online (68.3%), and finally, to the enhancement of cooperation between teachers (51.8%) (Table 14).

5.5. Q4 How Teachers' Demographics Influenced eTwinning Seminars?

Firstly, we investigate whether and to what extent the overall evaluation of the seminar differs statistically significant based on the demographic characteristics of the respondents.

To test the normality of the responses to the question “*eTwinning seminar met my expectations*” a Kolmogorov-Smirnov test indicated that the response values do not follow a normal distribution, so non-parametric tests were used in SPSS.

More specific, a Mann-Whitney U test was run and determined that evaluation was statistically significantly different between males and females ($z = 5.039$, $p = 0.000$), while a Kruskal-Wallis was run and determined that evaluation was statistically significantly different between age ($\chi^2 = 31.951$, $p = 0.000$), professional status ($\chi^2 = 45.8$, $p = 0.000$), years in profession ($\chi^2 = 49.962$, $p = 0.000$), workload per day ($\chi^2 = 10.486$, $p = 0.015$) and thematic topic ($\chi^2 = 11.402$, $p = 0.022$).

For the demographic variables in which a statistically significant effect was found, in order to further investigate the relationship, the means of the responses on the Likert-5 scale were calculated and it was found that the female teachers ($M = 4.25$), trainees over 47 years old ($M = 4.27$), teachers with a permanent employment status ($M = 4.25$) and those with 20 - 30 years of experience ($M = 4.31$) show higher levels of meeting expectations, compared to the rest of the teachers in the sample. In addition, the teachers who attended Topic 2 “Tools for content creation and multimedia processing” show a higher average value of meeting expectations ($M = 4.26$), compared to those participated in other seminars.

Table 14. Skills acquired by the participants.

Skills	Respondents had to choose one of the following options				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Skills in the use of Web 2.0 tools	2.8	4.7	13.2	45.8	33.6
Confidence as to the ability to manage student groups online	3.6	6.0	22.1	42.6	25.7
Enhancement of cooperation between teachers	4.4	12.5	31.3	37.4	14.4
Introduction of new techniques in the teaching	2.3	5.3	14.8	43.3	34.4
Lesson preparation methods	0.8	2.7	19.4	55.9	21.2

Then, we investigate whether and to what extent the evaluation of support, educational material and professional development opportunities differs statistically significant based on the demographic characteristics of the respondents.

To test the normality of the responses to the relative questions a Kolmogorov-Smirnov test indicated that the response values do not follow a normal distribution, so non-parametric tests were used in SPSS.

More specific, a Mann-Whitney U test was run to determine any statistically significant difference between evaluation of support, educational material and professional development opportunities and gender and a Kruskal-Wallis was run to determine any statistically significant difference between evaluation of support, educational material and professional development opportunities and age, educational level, professional status, work permanence status, years of work and ICT level.

Table 15 provides a summary of the results, skipping statistical details for reasons of brevity of space.

Finally, a chi-square test of independence was conducted between demographic data and communication. More specific, there was a statistically significant association between:

- Num of participants communicating and work permanence status ($X^2(8) = 35.15, p = 0.000, V = 0.153$).
- Num of participants communicating and years of work ($X^2(8) = 59.678, p = 0.000, V = 0.141$).
- Num of participants communicating and gender ($X^2(8) = 16.82, p = 0.002, V = 0.150$).
- Num of participants communicating and age ($X^2(8) = 28.422, p = 0.005, V = 0.112$).
- Frequency of communication and age ($X^2(8) = 28.422, p = 0.005, V = 0.112$).
- Frequency of communication and work permanence status ($X^2(8) = 90.93, p = 0.000, V = 0.246$).
- Frequency of communication and professional status ($X^2(8) = 13.071, p = 0.042, V = 0.093$).
- Frequency of communication and years of work ($X^2(8) = 92.012, p = 0.000, V = 0.202$).
- Frequency of communication and age ($X^2(8) = 17.34, p = 0.001, V = 0.152$).

6. Discussion

Results show that most respondents spent 2 hours per week studying mainly during the weekend, communicating with trainees in the same class, while the use of the forum gathered the most responses as a means of communication with trainers and trainees. Also, most of the respondents expressed a positive opinion about the role of the trainer and specifically in terms of the consistency, knowledge, constructive feedback, guidance, encouragement of communication and facilitation that he provided them, as [Holmes & Sime \(2012\)](#) also found in their research.

Table 15. Correlations between evaluation topics and demographics.

Items	Demographics ^a				
	Age	Educational level	Professional status	Work permanence status	Years of work
Support					
Personal communication with the trainer	Y	-	-	Y	Y
Personal communication with trainees	Y	-	-	Y	Y
Personal communication with the support team	Y	-	-	Y	Y
Forum communication with the trainer	-	Y	-	-	Y
Forum communication with trainees	-	-	-	-	-
Forum communication with the support team	-	-	-	Y	Y
Educational material					
Clarity	-	Y	-	-	-
Completeness	-	-	-	-	-
Appropriateness	-	-	Y	-	-
Difficulty	Y	-	-	Y	Y
Professional development opportunities					
Readiness and speaking in the mother tongue	Y	-	-	Y	Y
Speaking in foreign languages	Y	-	-	Y	Y
STEAM skills	-	-	-	Y	-
ICT skills	Y	-	-	Y	Y
Social and political skills	-	-	-	-	-
A sense of innovation and entrepreneurship	-	-	-	-	-
Learn how to learn	-	-	-	-	Y
Cultural expression and awareness	-	-	-	-	-
Increasing motivation and student learning outcomes	-	-	-	-	-
Professional and pedagogical development of teachers	Y	Y	-	Y	Y
Development of a culture of cooperation between members in school units	-	Y	Y	-	-

^aY: statistically significantly different.

For support tasks respondents stated that they used personal communication with trainers and trainees, while to a greater extent they used forum with the trainer and fellow trainees. The main communication was with the trainer and with other trainees, usually in a monthly basis, where most of the participants were using the platform's forum and internal messaging system. Age and working relationship statistically significantly affect communication with the trainer, the trainees and the technical support team and the educational level affect communication through forums with fellow trainees. Also, employment relationship, job position, years of service, gender and age affect the frequency of communication.

Also, they stated that their expectations from the seminar were fulfilled. This is also confirmed by the fact that most of the respondents strongly agree that the training material was appropriate in terms of clarity, completeness, and appropriateness, while most of the respondents stated that through the seminar the participants acquired additional skills and abilities. Gender seems to affect evaluation of the training material, while age and work relationship influence the extent to which trainees evaluate training material difficult. The level of education affects the degree to which trainees consider the training material to be relevant, while the job position affects the degree to which the trainees consider the training material to be suitable for the specific subject.

Gender, age, employment relationship and years of service are demographic factors that statistically significantly affect the levels at which participants met their expectations in the eTwinning seminar they attended. Female teachers, older teachers, permanent teachers, and those teachers who have 20 - 30 years of experience, tend to a greater extent to declare that their expectations from participation in the seminar were met compared to the rest of the participants. Thematic topic of the seminar had a statistically significant effect on the extent to which the teachers' expectations from their participation in the eTwinning seminar were met. Participants in Topic 2 "Tools for content creation and multimedia processing" show higher levels of meeting expectations compared to teachers who attended other training programs.

Regarding professional development, most of the respondents agreed that opportunities for ICT and metacognitive skills development were provided during the seminar. In addition, respondents stated that they acquired technical skills on using Web 2.0 tools, confidence in the ability to manage student groups online and developed new techniques in teaching, a result like the work of [Cingotto \(2017\)](#), [Pateraki \(2018\)](#) and [Kearney & Gras-Velazquez \(2015\)](#). Gender of the respondents affects the sense of developing mathematical ability, the sense of innovation, the ability to learn how to learn, the development of cultural expression, the motivation improving learning outcomes and the professional development of teachers. Age and working relationship of the trainers affect the degree to which the trainees consider that the seminar provided them with opportunities in the acquisition of ICT skills, as well as in their professional and educational development. The level of education affects the extent to which

trainees consider that opportunities for professional and pedagogical development, as well as opportunities for developing culture and cooperation between members in school units, were developed during the seminar. The opportunity to develop culture and cooperation is also statistically significantly affected by the job position.

7. Conclusion

This research provides useful insights that can be used by eTwinning seminar organizers, as considering the results, they can reorganize the educational material, the activities of the seminar and the way of its implementation to maximize the benefits created for the participants. Since age, years of service and job position influence many aspects of trainees' opinions and practices, educational stakeholders could organize more cohesive groups of trainees, based on their demographic characteristics. This process will provide a common ground of interests among the participants, which may contribute to better communication, feedback, and interaction.

The findings of this study offer valuable implications for eTwinning seminar organizers, who, upon taking these results into account, can effectively restructure the seminar's educational content, activities, and overall execution to optimize the benefits accrued by the participants. It is evident that demographic factors such as age, length of service, and professional rank significantly impact the perspectives and practices of the trainees. Consequently, it is proposed that educational stakeholders curate more homogeneous training groups, taking these demographic factors into consideration. This approach would foster a shared sphere of interests among the participants, thereby facilitating improved communication, constructive feedback, and more meaningful interactions.

For education policy makers, the results of this research show that teachers' participation in eTwinning seminars contributes to the acquisition of skills and the development of capacities and opportunities, which in turn contribute to the implementation of more effective teaching practices. Therefore, it is suggested that the Ministry of Education create greater incentives for teachers to participate in eTwinning seminars, which will be related to certification and career development.

Finally, subsequent studies are needed, following mixed methods design, to utilize the statistical results obtained from this research in combination with interviews with participants of eTwinning seminars. Future research should focus on other types of eTwinning seminars as well, to study the change over time in the opinions of trainees regarding their participation in this type of online learning communities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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