RESEARCH ARTICLE

Teachers' perceptions on the need for the development of their digital skills, under the Tech Talent School for Educators program, in the COVID-19 era

Paraskevi Iatrou * iD ✉
Socialinnov, GREECE

Stella Psarrou iD ✉
Socialinnov, GREECE

Gabriela Telekfalvi iD ✉
Socialinnov, GREECE

Renolena Papagiannopoulou iD ✉
Socialinnov, GREECE

Abstract

This paper is a quantitative research study of teachers' perceptions and experiences in relation to their training needs and expectations for the improvement of their digital skills, considering the special circumstances due to the COVID-19 pandemic. The research data were gathered in order to design, administer, and evaluate a 15-hour synchronous distance training program. The research tool used was questionnaires, and the research questions were: (1) To what extent do teachers consider that they need training for the development of their digital skills and for their professional empowerment? (2) To what extent did the structure and implementation of the specific program meet their expectations and needs? The findings of the research show that teachers consider their training necessary for the development of their digital skills and that the level of satisfaction of the participants in the program is high.

Introduction

The use of digital technologies in education in recent years, and especially with the new needs that emerged during the period of the COVID-19 pandemic, from a component of the educational process that functioned piecemeal and ancillary, gained a dominant role and became a factor of professional competence for teachers (Azorín, 2020; Chang & Yano, 2020; Reuge et al., 2021; OECD, 2020; UNESCO, 2020). Teachers recognize the need for further training, both in the tools and capabilities offered by digital technologies (European Commission, 2014; Perifanou, Economides, & Tzafilkou, 2021) and in modern educational approaches, through interdisciplinary approaches with experiential and inquiry processes emerging in STEM / STEAM education (Boon Ng, 2019; Psycharis, Kalovrektis, & Xenakis, 2020), the development of computational thinking (Wing, 2014); and educational robotics (Denis & Hubert, 2001; Afari & Khine, 2017) as their key element (Margot & Kettler, 2019; Taimur, Sattar, & Dowd, 2021; van der Spoel et al., 2020). To meet the training needs of teachers, seminars and training activities are organized by public bodies, such as universities, the Institute of Educational Policy, and co-financed European projects (Accelerated Training in Distance Education) (Perifanou & Economides, 2021). Through social networks, teacher support groups have been created (e.g., eTweening, Scientix, Amgen Teach, Khan Academy), which, despite their informal structure, have a response to teachers (European Commission, 2019). As part of the educational activities of Socialinnov, in May 2020, the Greek NGO conducted a quantitative survey with a sample of more than 100 teachers in order to record the teachers' perceptions, understand the current situation, and identify the needs of schools and teachers in relation to the digital transformation in the era of COVID-19. The results of the research show that more than 85% of the teachers in the sample consider it necessary to be trained in digital technologies for their use in teaching through digital platforms (Socialinnov, 2020). Based on the findings of the research, the experience gained from the digital teacher empowerment programs organized by Socialinnov from 2019 to 2021 and the needs of teachers, as identified by relevant research (European Commission, 2019), Socialinnov designed and implemented the *Tech Talent School for Educators* program. The program offers a holistic approach to the professional empowerment of educators, not only in relation to their pedagogical skills but also as professionals. In addition, it focuses on enhancing teachers' mental resilience, as they belong to a high-risk group for burnout syndrome. The program started in June 2021 and in December 2021 its first cycle was completed. It is addressed to primary and secondary education teachers in public and private education who work in schools in Greece and abroad. Participation in the program is free and is implemented with the funding of the Ioannis S. Latsis Public Benefit Foundation and the support of Microsoft Hellas, marking a new era for the Socialinnov program for educators, which aims to utilize technology for the development of their digital skills while offering, at the same time, support in the fields of professional empowerment and mental health. Furthermore, several training cycles

of the program have been run in collaboration with the Regional Centers for Educational Planning.

The program consists of three thematic pillars.

1. **Digital skills:** training of teachers in innovative technologies aiming to strengthen their digital skills in order to respond effectively to their role as teachers in modern educational environments. The 11-hour training for digital skills includes a theoretical framework with reference to modern pedagogical approaches (STEM/STEAM Education, Computational Thinking, Educational Robotics, Inquiry Learning, Problem Solving), analysis and practical application of digital tools (software), while the trainees have available digital material for further study and rights of access to the digital tools, even after the completion of the program cycle, so that it is possible for them to further study and practice.

2. **Professional Empowerment:** viewing teachers as professionals who want to further develop their careers or are aiming to find a new job. In this context, the program offers guidance for creating a digital resume, presenting their work, and meeting the requirements of a professional interview.

3. **Mental resilience:** Teachers are at high-risk for occupational burnout syndrome, and the third pillar is supported by mental health professionals, who provide educators with access to tools and techniques in order to recognize and prevent burnout syndrome.

The present research focuses on the pillar of the digital skills of the program, and an attempt is made to investigate the following questions:

1. To what extent do educators consider that they need training in order to develop their digital skills and professional empowerment?

2. To what extent does the structure and implementation of the specific program meet their expectations and needs?

Methodology

The research is quantitative and examines the perceptions and experiences of primary and secondary school teachers in relation to their need to be trained, in order to improve their digital skills and the benefits gained by participating in the program Tech Talent School for Teachers. Our sample includes primary and secondary school teachers from Greek schools in our country and abroad.

The methods of research materials used are questionnaires, with closed and open type questions. A demographic questionnaire was initially given, which was completed by 2,029 teachers. After

their registration and for attending the program, they were given a questionnaire regarding their needs and experiences, which was completed by 1,115 people. Finally, an evaluation questionnaire was completed by 205 teachers who have completed the training cycle, participating in all three pillars of the program. The exit questionnaire was completed after a reasonable period of time, so that they had time to apply the tools and methodologies presented in the training. The present research includes data concerning the pillar of digital skills. As the program continues, the number of evaluation questionnaires is smaller than the original one.

Results

Based on the findings of the demographic questionnaire, the educators who declared their participation in the program, came from various parts of Greece, which included remote areas and small islands. The map (see **Figure 1**) shows us the origins of the educators who registered in the program. Some of the most remote areas are the following: Alexandroupoli, Komotini, Xanthi, Igoumenitsa, Kastoria, Kastelorizo, Orestiada, Agathonisi, Heraklion, Astypalea, Kalymnos, Samos, Kos, Lesvos, Lefkada, Lemnos, Mytilene, Schinoussa, Chios.
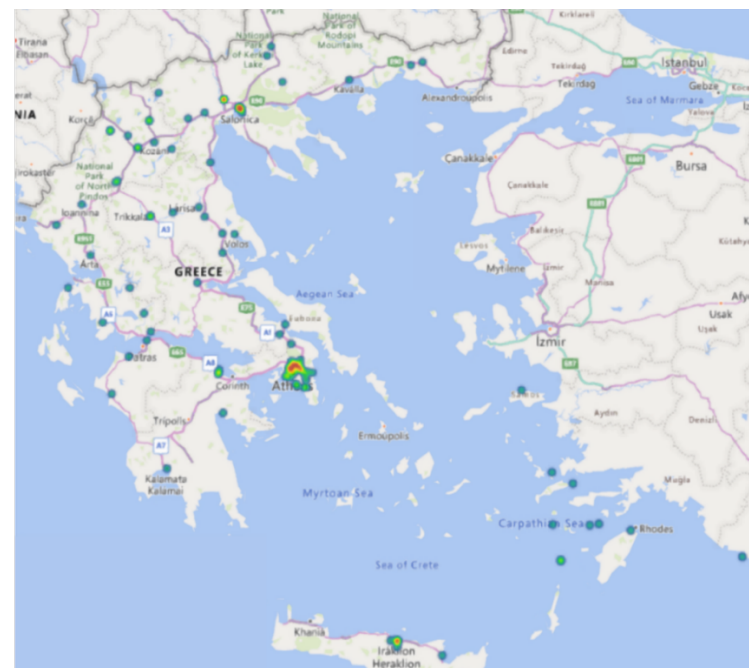

Figure 1. Regions of origin of educators

Female teachers, who declared their participation in the program, constitute the largest percentage of the participants (see **Table 1** and **Figure 2**).

Table 1. Educators' gender

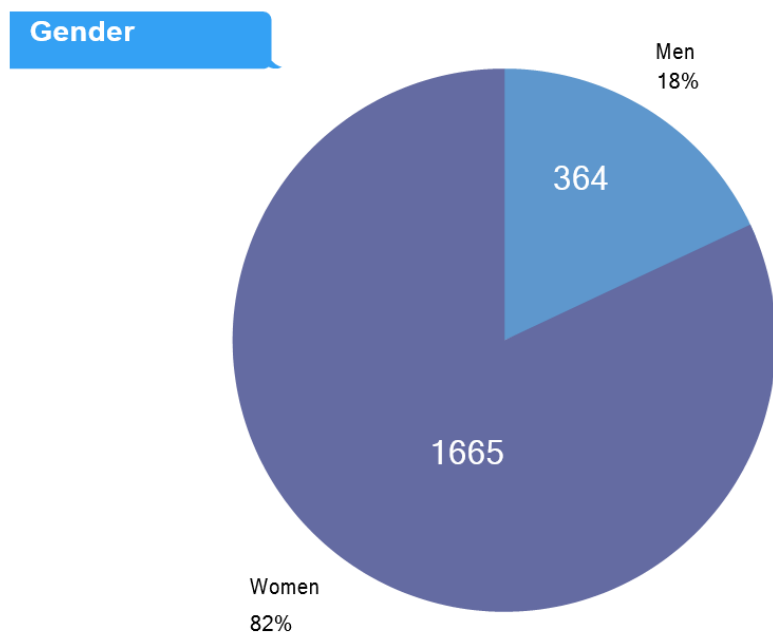| Gender of educators	Percentage
Women	82%
Men	18%

Figure 2. The number and percentage of educators by gender

Finally, there is a great variety in the specialties of the teachers who registered in the program. The specialties with the highest percentages are: Teachers 18%, Philologists 16.3%, Kindergarten Teachers 9.7%, Informatics 6.3%, Mathematicians 6.2%, English Language 5.5% (see **Figure 3**).
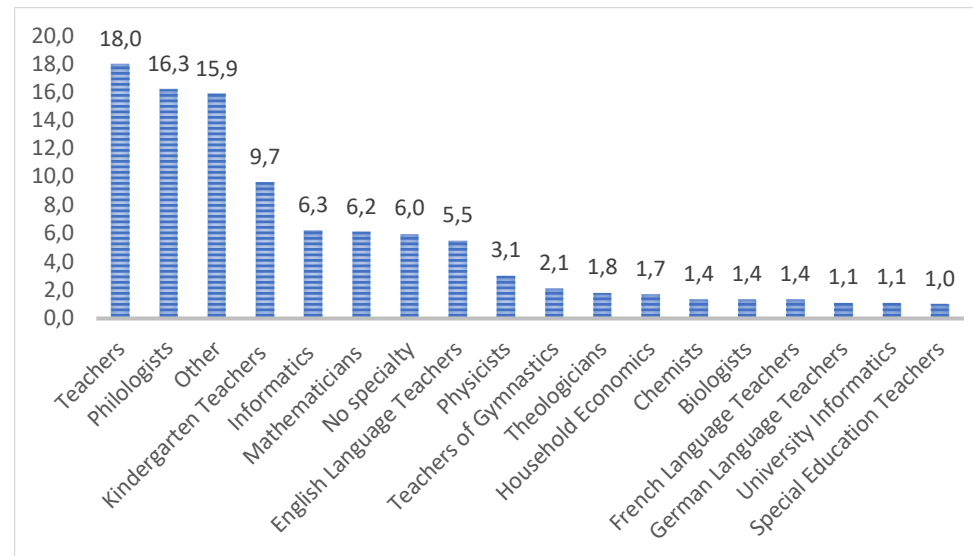

Figure 3. Breakdown of educators by subject area who registered for the program

The questionnaire recording the needs and experiences of teachers highlights their views on their readiness to cope with the new conditions that have arisen due to the pandemic. This data shows that teachers believe that the support they received for the use of digital tools in the classroom comes from informal forms of support, such as colleagues, and from the friendly / family environment at a rate of 60%. (see **Table 2**). In relation to their readiness to design and implement digital courses, 29% of teachers state that they have the skills to design and implement them, while only 14% of teachers believe that university studies prepared them to use digital tools in educational practice (see **Table 3**).

Table 2. Support for the use of digital tools by educators

Educators' views on the use of digital tools in the classroom and where do they receive support from	Percentage
Colleagues	31.58%
Friendly/Family environment	28.54%
School Unit	23.08%
Ministry of Education	16.80%
Total	100%

Table 3. Educators' views and experiences on the use of digital media in educational practice

	Much less	Moderately less	Neutral	Moderately more	Much more
How prepared were you to conduct your lesson in a digital environment during the pandemic response measures?	14,68%	23.08%	32,79%	20.85%	8.60%
Do you think that university studies adequately prepare you for the use of digital tools in the classroom?	25.73%	30.97%	27.53	9.92%	4.05%

Educators report, at a rate of 62%, that they have not implemented the following actions during their educational process. **Table 4** presents in detail the percentages of teachers with the type of actions they implemented, having the opportunity to choose more than one action. Finally, 80% of educators consider the implementation of STEM activities in the educational process important (see **Table 5**).

Table 4. Educators' answers for actions they have implemented

Which of the following actions have you implemented as a teacher?	Percentage
Robotics lab	9.72%
Computer lab	21.76%
STEM lab	9.21%
Programming lab	8.1%
Technology lab	7.59%
Other	4.76%
None of the above	62.35%

Table 5. Educators' views on the implementation of STEM activities in the educational process

How important do you consider the implementation of STEM activities in the educational process?	Percentage
Very unimportant	14.68%
Somewhat unimportant	23.08%
Neutral	32.79%
Somewhat important	20.85%
Very important	8.60%

From the evaluation questionnaire of the program, we observe that teachers consider the organization of the program good or higher in a percentage of 85% (see **Table 6**), while in a percentage of 79.4% consider the duration of the seminars of the digital skills pillar reasonable and with a percentage of 66.83 % they stated that the content of the seminars was good or better, in relation to their level of previous knowledge (see **Table 7**).

Table 6. Educators' answers on the organisation of the programme

What do you think about the organisation of the Tech Talent School for Educators?	Percentage
Very dissatisfied	0.98%
Somewhat dissatisfied	1.95%
Neither satisfied nor dissatisfied	13.17%
Somewhat satisfied	49.76%
Very satisfied	34.15%

Table 7. Educators' answers on the organisation of the programme

The duration of the digital skills pillar seminars was:	Percentage
Short	18.09%
Reasonable	79.40%
Long	2.51%
Based on your level of knowledge, the level of difficulty attending the digital skills pillar seminars seemed to you:	**Percentage**
Easy	24.62%
Reasonable	66.83%
Difficult	8.54%

For the presenters of the program, the teachers consider that they are very good to excellent in terms of their transmissibility 82%, in terms of subject knowledge 90% and in terms of communication 82% (see **Table 8**).

Table 8. Educators' responses to the digital skills pillar questions of the survey

	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
How do you judge the transferability of the digital skills pillar instructors?	0.5%	2.51%	15.08%	44.22%	37.69%
How do you judge the subject knowledge of the digital skills pillar instructors?	0.5%	1.51%	7.54%	42.21%	48.24%
How do you judge the communication with the instructors of the digital skills pillar?	1.01%	2.51%	14.07%	40.7%	41.71%

Finally, in terms of knowledge gained, teachers believe that they have certainly acquired new knowledge from the digital skills pillar seminars by 84%, while they stated that the knowledge gained will help them develop their role as teachers by 88% (see **Table 9**).

Table 9. Educators' responses on the knowledge gained

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly Agree
Do you consider that you gained new knowledge from the digital skills pillar seminars?	0.5%	9.05%	53.27%	31.19%
Do you feel that the knowledge you have gained will help you develop your role as a teacher?	0.5%	11.56%	46.23%	41.71%

Conclusions

In accordance with the findings of the research, educators from a variety of specialties believe that they must be trained in digital tools in order to further develop their digital skills. This belief is supported by a lack of support for digital tool training, their inexperience with designing and implementing digital courses, and their limited use of digital tools throughout their university studies. In accordance with research (Alea et al., 2020; Niemi & Kousa, 2020), instructors believe they are capable of adapting to the new manner of teaching mandated by COVID-19, but they also believe they are experiencing difficulties as a result of a lack of facilities and equipment, as well as the development of distant education abilities (Alea et al., 2020). Female teachers make up the largest percentage of participants in the program, nevertheless, one factor to consider, as mentioned in a comparable survey (Alea et al., 2020), is the proportion of female teachers in each country. At a high level, participant satisfaction is determined by a variety of factors, including the structure of the program, the instructors, the communication, the duration, the level of difficulty, and the substance of the program. The material is subsequently evaluated in terms of its relevance to their professional development, and the process is repeated. Educators think that incorporating STEM activities into the educational process is vital, despite the fact that many STEM teaching activities have not yet been implemented. Even without making any general conclusions about teacher empowerment in terms of digital abilities, it indicates that instructors, depending on their circumstances, require proper training, and that the quality of course design and implementation varies greatly. One final point to mention is that the proportion of participants in the program when compared to initial applications is about 50%, which is commensurate with the dropout rate that is associated with free programs.

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Appendix 1
Entry Questionnaire

1. Region of educational institution

2. How many students do you teach in a school year?

3. Educational level

4. Where do you work?

    A) Unemployed

    B) Public institution

    C) Private institution

    D) College student

5. Gender

    A) Male

    B) Female

6. Year of birth

7. Your specialty

8. Do you think that university studies adequately prepare you for the use of digital tools in the classroom?

    A) Much less

    B) Moderately less

    C) Neutral

    D) Moderately more

    E) Much more

9. How prepared were you to conduct your lesson in a digital environment during the pandemic response measures?

    A) Much less

    B) Moderately less

    C) Neutral

    D) Moderately more

    E) Much more

10. From whom did you receive instructions and guidance on managing synchronous/asynchronous teaching platforms during the Covid19 period?

    A) Colleagues

    B) Friendly/Family environment

    C) School Unit

    D) Ministry of Education

11. How important do you consider the implementation of STEM activities in the educational process?

   A) Very unimportant

   B) Somewhat unimportant

   C) Neutral

   D) Somewhat important

   E) Very Important

12. Which of the following actions have you implemented as a teacher?

   A) Robotics Lab

   B) Computer lab

   C) STEM Lab

   D) Programming Lab

   E) Technology Lab

   F) Other

   G) None of the above

Feedback questionnaire

1. What do you think about the organisation of the Tech Talent School for Educators?

   A) Very dissatisfied

   B) Somewhat dissatisfied

   C) Neither satisfied nor dissatisfied

   D) Somewhat satisfied

   E) Very satisfied

2. The duration of the digital skills pillar seminars was:

   A) Short

   B) Reasonable

   C) Long

3. Based on your level of knowledge, the level of difficulty attending the digital skills pillar seminars seemed to you:

   A) Easy

   B) Reasonable

   C) Difficult

4. How do you judge the transferability of the digital skills pillar instructors?

   A) Very dissatisfied

   B) Somewhat dissatisfied

   C) Neither satisfied nor dissatisfied

   D) Somewhat satisfied

   E) Very satisfied

5. How do you judge the subject knowledge of the digital skills pillar instructors?

   A) Very dissatisfied

   B) Somewhat dissatisfied

   C) Neither satisfied nor dissatisfied

   D) Somewhat satisfied

   E) Very satisfied

6. How do you judge the communication with the instructors of the digital skills pillar?

   A) Very dissatisfied

   B) Somewhat dissatisfied

   C) Neither satisfied nor dissatisfied

   D) Somewhat satisfied

   E) Very satisfied

7. Do you consider that you gained new knowledge from the digital skills pillar seminars?

   A) Strongly disagree

   B) Somewhat disagree

   C) Somewhat agree

   D) Strongly agree

8. Do you feel that the knowledge you have gained will help you develop your role as a teacher?

   A) Strongly disagree

   B) Somewhat disagree

   C) Somewhat agree

   D) Strongly agree

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