









Continuing Teacher Education: Informal Collaborative Teacher Network as a Response to the Emergency Context Created by COVID-19

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Abstract. The COVID-19 pandemic posed unprecedented challenges to the education sector, necessitating a rapid transition to emergency distance learning and highlighting the need to train teachers to maintain educational continuity under lockdown restrictions. In response, initiatives such as “Online Pedagogical Sharing” emerged, comprising short-term training activities aimed at educators and teachers at all levels of education in Portugal. This case study, conducted within a qualitative paradigm, explores how training organised by this informal collaborative network contributed to the continuous professional development and adaptation of teaching practices during the pandemic. It utilised digital technologies to meet the demands of distance learning and improve the pedagogical use of new technologies. The sessions, which took place between June and July 2020, were widely accessible, facilitating a meaningful collaborative approach in the teaching environment. By analysing data collected during these sessions, the study highlights the network’s effectiveness in facilitating collaborative learning and the impact of educational technologies during a time of significant pedagogical change. This work not only documents the immediate response to the crisis but also suggests avenues for future use of similar practices in post-pandemic contexts, emphasising the need for further analysis of the resilience and effectiveness of these adapted pedagogical strategies.

Keywords: Emergency Remote Teaching · Teacher Training · Collaborative Networks · Learning Communities · Educational Technologies

1 Introduction

With the onset of the COVID-19 pandemic, the education sector faced unprecedented challenges that required a rapid transition to emergency distance education [1–3]. This radical shift highlighted the urgent need to train teachers to maintain educational

continuity through remote teaching while adapting to the constraints of confinement [3–5].

In response to this context, learning communities, communities of practice and collaborative networks between teachers were developed, albeit on an informal basis [6–8]. As a result, an organised training initiative called “Online Pedagogical Sharing” emerged, which aimed not only to train educators and teachers but also to evaluate the impact of the various activities undertaken, including short-term training and online meetings.

This study, framed within a qualitative paradigm and configured as a case study, focuses on the analysis of the “Online Pedagogical Sharing” initiative. These sessions, which took place between June and July 2020, were certified by a higher education institution (HEI) and targeted a wide range of educators and teachers from different levels of education in Portugal. The initiative was widely publicised through the institution’s virtual media, facilitating free participation.

The importance of sharing knowledge and collaborating on pedagogical strategies to adapt teaching practices to the pandemic’s disruptive environment is emphasised by the author [9]. Another thesis, defended by [10], highlights the significance of leveraging digital technologies and collaborative approaches to support teachers’ development and training in emergency remote teaching scenarios.

In this context, “Online Pedagogical Sharing” emerged as a direct response to the need to adapt teaching practices to the disruptive environment caused by the pandemic. It promoted professional development and continuous training of teachers through a collaborative approach supported by digital technologies. This initiative aimed to meet the immediate needs of distance learning and harness the potential of educational technologies to improve teaching practice sustainably and innovatively.

Using an interpretive approach, this case study aims to understand how interactions in virtual meetings can contribute to the professional development of educators and teachers and the transformation of educational practices. The research focuses on the analysis of data collected during the virtual meetings, providing an in-depth look at the dynamics of collaborative learning and the impact of educational technologies at a time of significant pedagogical change.

2 Objectives and Methodology

In this section, we take a closer look at the aims and methodology of this research to clarify the procedures adopted to answer the central question of the study: How can an informal collaborative network/learning community/community of practice between teachers contribute to teacher education and professional development in the context of COVID-19? This question guides the core of our analysis and reflects the relevance of the topic in today’s educational landscape, which is characterised by unprecedented challenges due to the pandemic.

2.1 Objectives

The objectives of this research have been outlined to structure the stages of the investigation and to clearly define what the work is intended to achieve. These include the

creation of a collaborative network to support the continuous training and professional development of teachers, the characterisation of the profile of the participants and the development and application of a digital training programme. In addition, special attention will be paid to evaluating the impact of this network on the pedagogical practice of the participants. The specific objectives are as follows:

1. Create an informal collaborative network/learning community/community of practice between teachers to contribute to the ongoing training and professional development of teachers in the context of COVID-19;
2. To characterise the profile of educators and teachers participating in the online actions carried out in the context of COVID-19;
3. Create and apply a digital training programme to respond to pedagogical practices in the context of emergencies caused by COVID-19;
4. Evaluate the impact of the informal collaborative network/learning community/community of practice between teachers for ongoing teacher training and professional development in teaching in the context of COVID-19.

2.2 Methodology

The methodology used in this study is configured as a case study, focusing on a contemporary phenomenon that has manifested itself in a specific and circumstantial context. This approach has been used consistently by various authors, as referred to in [11–14]. The choice of this approach is based on the need for an in-depth analysis of events and practices that manifested themselves in a significant way during the 2019/2020 school year, particularly in virtual meetings with members of an information learning and professional development community.

According to [15], the qualitative-descriptive approach used in the study allows for an in-depth exploration of teachers' experiences and perspectives on adapting to distance learning in challenging times. This approach, also used by other authors such as [15–18], was adopted in our study to analyse the data collected. This approach thus allows for a richer interpretation of the interactions and communicative processes within the community, highlighting how pedagogical practices and collaborations were adapted and developed in response to the COVID-19 pandemic.

A questionnaire survey was used to collect the data, as this data collection technique makes it possible to study the perceptions of the members of an informal learning and professional development community of the educational reality, circumscribed and socially represented in the emergency context marked by COVID-19. This method, as demonstrated by [19], is useful for obtaining information on different phenomena. This approach is corroborated by previous studies, such as those by [15, 18, 20], in which questionnaire surveys were used to collect data on teachers' awareness of COVID-19, their experiences with distance learning and their perceptions of the preparation and challenges faced by the institutions.

3 Implementation and Data Collection

As part of the research on the informal collaborative network/learning community/community of practice between teachers, aimed at continuing training and professional development in the educational context affected by COVID-19, the following data collection instruments were used:

- Programmes of the 26 short-term training actions (AFCD) entitled “Online Pedagogical Sharing”;
- AFCD enrolment questionnaire survey;
- AFCD evaluation questionnaire survey.

These AFCDs gave rise to an ongoing training programme called “Online Pedagogical Sharing”, which was implemented during the pandemic and delivered entirely through e-learning. The main objectives of this programme were to explore the potential of technology-enhanced methodologies for the development of essential skills for the 21st century, as defined in the profile of students leaving compulsory education and the essential learning outcomes. It also aimed to promote the use of active learning strategies with technology to increase student engagement and the quality of learning.

The virtual meetings, which lasted 3 h each, took place between 5 July and 31 July 2020 and were hosted by a group of trainers and participants, including educators and teachers from different levels of education.

The programmes of the 26 AFCDs listed in Table 1, were structured according to the following elements: name of the action, modality, duration, target group, trainers, (virtual) location, date, name, context, objectives, promotion methodology and recognition and certification criteria.

The questionnaires were designed in the Microsoft Forms application and administered in digital format. The AFCD enrolment questionnaires were made available to the target audience through the university’s media and the AFCD evaluation questionnaires were given to the participants at the end of the training sessions.

The aim of the registration questionnaire for the 26 AFCD was to characterise the profile of the participants in the online actions and it contained 10 questions organised according to the following three dimensions A) Socio-professional characterisation of the participants: 1) email address; 2) full name; 3) contact mobile phone; 4) age; 5) gender; 6) level of education; 7) region where they work; B) Knowledge of digital tools: 8) use of digital tools in pedagogical practice; 9) motivation to participate in online training on digital tools; C) Perception of training needs: 10) identification of training needs in digital tools or areas of interest. Questions 1, 2, 3 and 10 are open and questions 4, 5, 6, 7, 8 and 9 are closed.

The questionnaire used to evaluate the 26 AFCDs aimed to assess the impact of the collaborative network on the professional development of teachers and included five questions organised according to the following dimensions a) Satisfaction with the planning/execution; b) Satisfaction with the methodology; c) Quality of the materials; d) Overall evaluation of the training; and e) Suggestions for topics to be covered in future actions. Questions 1, 2, 3 and 4 are closed and question 5 is open. The construction of the closed questions was based on a Likert scale with the following ranges 1-poor, 2-poor, 3-good, 4-very good, 5-excellent. The Likert scale is a psychometric tool often

Table 1. List of AFCDs

No. of AFCS	Name of AFCD
1	Erasmus & eTwinning: Innovative teaching methods and cooperation
2	Robotics clubs in the construction of learning
3	eTwinning - Small steps, big achievements
4	BYOT tools as a lever for student participation Kahoot and Socrative
5	Edmodo - Learning beyond the classroom
6	Dynamic and creative lessons with Educaplay and LearningApps
7	Create a learning scenario using Drive tools
8	Using Google Classroom for face-to-face and distance learning
9	Monitoring and evaluating learning with the SIMA platform
10	Europeana - Digital cultural heritage in education
11	Scientix - Bringing research into the classroom
12	Using Microsoft Teams in face-to-face and distance contexts
13	Learning and teaching robotics online
14	Engaging students in activities with Nearpod and Ted Ed Lessons
15	Didactic exploration of the tools Symbaloo, Genial.ly and Thinglink
16	eTwinning projects in Portuguese, French and English and the QR Code, Vizia and Padlet tools
17	Creating comics and learning scenarios with Google Slides and Bitmoji
18	Promoting educational success using the Emaze, Mentimeter and Quizlet tools
19	eTwinning projects in Portuguese, English and CD in grades 7, 9 and 10, in Portuguese in grades 7 and 12 and the tools Tricider, Creartuavatar and TradingCard
20	Tinkercad - Programming and simulation of electronic circuits controlled by Arduino
21	Classroom and distance learning with the Milage Aprender + APP
22	How to use Quizizz to enhance E@A and classroom teaching
23	Let's learn to play: Minecraft education and Clasdojo
24	Creating interactive maps and developing collaborative work with Google Maps and Tour Builder
25	Bringing content to life with Powtoon, Biteable, Madmagz, Issuu and Calaméo
26	Creativity in action with Book Creator and Flipgrid tools

used to assess attitudes, opinions, perceptions and behaviours. The scale consists of a series of statements or questions to which respondents indicate their level of agreement or disagreement [21–24].

The results of the open and closed questions in the questionnaires were analysed using Excel files from the Microsoft Forms application. To study the quantitative data, descriptive data analysis was carried out, using basic descriptive statistics to summarise the numerical data, creating graphs and tables to visualise the distribution of the data and identify patterns and trends, and interpreting the results, checking the statistical significance of the conclusions and presenting the main considerations.

To study the qualitative data, we imported the qualitative data into MAXQDA Analytics Pro-2022 software, carried out qualitative content analysis using MAXQDA's paraphrasing tool, based on criteria for coding the textual data (raw material), such as identifying and classifying relevant keywords, specific concepts, themes and meanings that emerged organically from the analysis (inductive approach), (inductive approach) and categorisation criteria (patterns or principles) to group and organise the codes into broader categories such as frequency of occurrence/opinion, thematic similarities, conceptual relationships and other relevant criteria for organising and interpreting the data. Indicators were also created to identify when a particular code, category or theme should be applied to the data, to identify, describe, interpret and understand the patterns and trends underlying the data more deeply and generate meaningful insights.

4 Results

This section presents the main findings from the analysis of data collected during the “Online Pedagogical Sharing” and other training activities in the context of the COVID-19 pandemic. The analysis, guided by the specific objectives established in the study, focused on characterising the profile of participants, their use and perception of digital tools, and assessing the impact of communities of practice and collaborative networks on professional development and in-service teacher training. The results are essential for understanding the dynamics of adaptation to emergency distance learning and identifying the training needs of teachers in a period of rapid pedagogical change.

For the objective related to the characterisation of participants, a total of 26 AFCDs responded to the registration questionnaire with 11.244 participants. The results were as follows: Age: 22–29 years: 1%, 30–39 years: 9%, 40–49 years: 42%, 50–59 years: 33%, 60–69 years: 14%, and over 69 years: 1%; Gender: male: 34%, female: 66%; Level of education: nursery school teachers: 2%, primary school teachers: 11%, secondary school teachers: 13%, high school teachers: 32%, secondary school teachers: 37%, special education teachers: 3%, higher education teachers: 2%; Region of work: North: 38%, Centre: 29%, Alentejo: 14%, Algarve: 18%, Azores: 0%, Madeira: 1%; Use of digital tools: no: 14%, little regularity: 22%, some regularity: 31%, regularity: 19%, high regularity: 6%, very high regularity: 8%; Interest in online training: yes: 98%, no: 2%; and regarding the indication of digital tools or areas in which they would like to receive training, Table 2 shows the results systematically, using a matrix that includes 2 categories and their respective indicators.

About Objective 4, to evaluate the impact of the collaborative information network/learning community/teaching practice community on the in-service training and

Table 2. Content analysis: Categories and indicators for P10 - “Digital tools or areas in which I would like to receive training”.

Categories	Indicators
1- Digital tools I would like to be trained in	Tinkercad, eTwinning, Nearpod, Ted Ed Lessons, Flipgrid, Educaplay, LearningApps, Emaze, Mentimeter, Quizlet, Kahoot, Quizizzi, Powtoon, Biteable, Madmagz, Issuu, Calaméo, Minecraft Education, Classdojo
2- Areas in which I would like to receive training	Digital tools, programming and robotics, active methods and educational assessment

professional development of teachers in the context of COVID-19, a total of 26 AFCD responded to the evaluation questionnaire 6.577 people and the following results were obtained: in terms of satisfaction with planning/execution: 1-Fair: 0%; 2-Poor: 0%; 3-Good: 0%; 4-Very good: 15%; and 5-Excellent: 85%; in terms of satisfaction with the methodology: 1-Weak: 0%; 2-Poor: 0%; 3-Good: 0%; 4-Very good; 6%; and 5-Excellent: 94%; in terms of quality of materials: 1-Weak: 0%; 2-Low: 0%; 3-Good: 0%; 4-Very good: 14%; and 5-Excellent: 86%; in the overall evaluation of the training: 1-Worse: 0%; 2-Low: 0%; 3-Good: 0%; 4-Very good: 8%; and 5-Excellent: 92%; and the suggestion of subjects to be addressed in future actions, the results are presented systematically in Table 3, using a matrix comprising five categories and their respective indicators.

Table 3. Content analysis: Categories and indicators for P5 - “Suggestion of subjects to be addressed in future actions”.

Categories	Indicators
1- Digital literacy training	Participate in training sessions on digital issues
2- Integration into teaching groups	Being part of a group of teachers that promotes the sharing of pedagogical practices
3- Participation in training courses and workshops	Participate in training courses and workshops with AFCD trainers
4- E-learning training	Receive e-learning training
5- Participation in educational projects	Participate in educational projects with AFCD teachers

The outcomes of the research include the creation of a learning community, a community of practice and a collaborative network of teachers linked to the HEI’s training organisation. A new initiative called “Meeting of Pedagogical Practices in Distance Learning” was also established, with the participation of teachers specialised in the areas covered by the “Online Pedagogical Sharing”. In addition, a training plan has been organised that includes certified AFCD, accredited courses and workshops, all delivered

through e-learning. These efforts have resulted in the digital training of educators and teachers in Portugal and even abroad.

5 Conclusions and Future Work

This study demonstrated the importance and effectiveness of informal collaborative networks and learning communities in the challenging educational context created by the COVID-19 pandemic. “Online Pedagogical Sharing”, an emerging training initiative implemented during the pandemic, proved to be a valuable tool for supporting teachers’ continuous professional development. These sessions facilitated the transition to distance learning and promoted the use of educational technologies to enrich teaching practices.

The results indicate that most participating teachers successfully adopted digital tools and are interested in continuing their training in this format. Data analysis revealed a high level of satisfaction with the training sessions, with participants expressing a strong desire to deepen their knowledge of digital tools and active methodologies, appreciating the relevance of digital competencies in today’s educational context.

The study also contributed to the formation of a sustainable community of practice that transcends traditional teaching boundaries, connecting educators at different levels through digital platforms. The “Meeting of Pedagogical Practices in Distance Learning” initiative exemplifies how these networks can continue to provide support and professional development in the post-pandemic period.

In summary, this case study highlighted the vital role of learning and practice communities in responding to an educational crisis and provided insights into how these structures can be used to strengthen teaching in a post-pandemic future. The integration of technology-enhanced methodologies and the promotion of active learning strategies emerge as critical components in evolving pedagogical practice and preparing effective responses to future educational challenges.

Future work will involve analysing the results of the “Meeting of Pedagogical Practices in Distance Learning” initiative in the post-pandemic context to assess the effectiveness and resilience of the pedagogical strategies adopted. Comparing these findings with those from the “Online Pedagogical Sharing” initiative implemented during the COVID-19 period will help identify the most appropriate methodologies for hybrid and distance learning, optimising educational resources for future crises or permanent integration into the educational system.

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