The Role of Digital Technology in Teacher Professional

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Abstract

This research will aim to closely examine the role of digital technology in teacher professional development. It will investigate the existing models of professional development in non-digital/face- to-face environments and compare them with the model of teacher professional development in a digital environment. The research will attempt to identify the problems faced by teachers in professional development mediated by digital technology. A qualitative research methodology will be used, with qualitative methods of data collection and analysis, including focus groups of teachers and narrative interviews with teachers. The research will be based on the paradigm of critical theory and the constructivist approach. The results of the research will aim to better explain the model of teacher professional development in a digital environment in the Republic of Croatia, organized by the Ministry of Science and Education and the Agency for Education, describe the differences compared to the previous face-to-face professional development model, determine the reasons for individual resistance to the digital environment model, and confirm how digital technology can mediate in teacher professional development.

Keywords: Digital environment, Digital technology, Professional development, Qualitative research, Teachers

Introduction

Professional development for teachers is legally prescribed as both a right and an obligation. It is conducted through programs approved by the Ministry of Science and Education.[1,2] Since 2018, the Ministry of Science and Education, as part of the educational reform, has introduced a new form of professional development in a digital environment, on the Loomen/Moodle platform. In this way, in addition to the existing training provided by the Agency for Education, teachers are also provided with a new model of professional development in a digital environment. A person must continuously learn to be able to keep up with changes.[3] Therefore, teachers must take on the role of lifelong learners.[4] Vizek Vidović,[5] according to the European Council Resolution on Lifelong Learning from 2002, cites 'the improvement and renewal of teachers' knowledge and skills to promote lifelong learning in their students' as a priority. A teacher must engage in lifelong education because lifelong learning and continuous professional development are the main mechanisms that encourage personal growth and development and prevent stagnation and routine in the life of an individual and in society.[5] Professional development of teachers involves continuous professional growth through official, group, or individual forms of education and acquiring additional knowledge and skills with the aim of improving personal qualities and skills in their profession and overall educational work (State Pedagogical Standard of the Primary Education System, 2008 and 2010). Although professional development is a broader concept than the professional training of teachers,[6] where the teacher is independent in professional development and directs it according to their interests, but also the needs of the system and the school in which they work,[7] it is based on the principles of lifelong education, which includes formal and informal learning.[8] Lifelong education of teachers[5] represents, along with formal education and professional development, one of the leading issues in every country. The professional development of teachers is part of the educational system in which appropriate time and support are dedicated to teachers in their lifelong learning (CARNET[7] according to OECD 2009). European trends in the teaching profession are focused on areas such as learning how to learn, developing digital competencies, critical thinking, and student-centered teaching.[9] Professional development should be viewed in the context of social constructivist theory,[10] considering the initial assumption that knowledge is constructed through the process of creating consensus within the learning group.[11] This is because the nature of the teaching profession requires intensive lifelong professional development.[12] Teacher education should

last throughout their working life, as specific knowledge and skills for future jobs could not be learned during initial education.[13] The quality of teachers and their continuous professional development is crucial in achieving quality education,[14] which is the most important factor influencing student success.[15] The process of improving the educational system of the Republic of Croatia also depends on the continuous professional development of teachers.[16] The task of organized professional development is to encourage teachers to reflect on their own examples of good practice, identify areas and strengths that need improvement and adaptation, and incorporate these renewed practices into their daily work.[17] Rapid technological development has transformed the environment into one that offers new opportunities for education and learning, compared to the time when teachers and text in the form of books were the only and main media, simultaneously having a significant impact on the choice of didactic solutions for learning and teaching (Matijević 2008). The implementation of technology in classrooms has posed the greatest challenges in the professional development of teachers, considering the teaching profession,[15] changing the way teachers' professional development is conducted.[18,19] Professional development in a digital environment has emerged as a response to all the problems in traditional face-to-face training, with its possibilities being more scalable compared to the mentioned training.[20] Traditional forms of professional development are becoming ineffective as they mainly meet institutional requirements, lacking authentic learning opportunities.[21] Professional development in a digital environment encourages collaborative learning,[22] regardless of time, space, material conditions, previous activities, identity, prior knowledge, preferences, and expectations, where teachers/ participants need to acquire not only content but also improve digital and communication competencies.[23] It has been observed that approaches to professional development of teachers in a digital environment must be similar to andragogical teaching models due to the methodology and way of learning, as well as the way they are evaluated.[19] Recent research shows that technology is an important factor in professional development.[19] Studies also indicate that teachers have used digital technologies more frequently and for longer periods after professional development in a digital environment,[24,25] with their satisfaction in using digital technologies increasing after professional development in a digital environment.[26,27] The perception of so-called superior, traditional, face-to-face training compared to training in a digital environment highlights flexibility as the greatest advantage of digital environment training, as it provides additional opportunities for research, learning, and acquiring professional knowledge, although both forms of professional development achieve the same outcomes.[28] Availability, continuity, expertise, and diversity as features of quality professional development are systematically aimed at developing competencies, improving the quality of teaching, and enhancing educational learning outcomes.[29] With the introduction of professional development in a digital environment, the

professional development and professional growth of educational staff in the Republic of Croatia have changed since 2018. In addition to the existing face-to-face professional development, teachers are also trained in virtual classrooms on the Loomen/Moodle platform.

Loomen/Moodle is a learning management system, a software tool for creating e-courses, conducting distance learning, and blended learning. It is based on the Moodle program, which is the most popular platform of this kind, used by numerous users worldwide. In the implementation of professional development, it is important to ensure the coherence of goals with the broader reform efforts present in society.[30] In educational reform, the teacher is one of the actors of substantive changes, involved in all reform processes, expected to implement them, and ultimately must carry them out. The quality of teachers is one of the most important factors in the quality of education,[31] following the reform processes that expect teachers to take an active role in lifelong learning, education, training, and professional development.

The burden on teachers from the reform process in the Republic of Croatia, which began in 2018 with the introduction of an experimental program in 74 schools (48 primary schools and 26 secondary schools), continued with the frontal introduction of the curriculum in all schools from the 2019/20 school year and the training for all teachers that began in December 2019, in virtual classrooms prepared for the frontal implementation of the curricular/educational reform. In this way, the teacher becomes a participant in a new form of professional development in a virtual environment, where they need to develop new skills and abilities, and thus develop new professional competencies in an online professional environment, which are assumed to correlate with the real environment.

Given that the change in the method and organizer of professional development represents a new model of professional development for teachers in Croatia, this paper will present how it was implemented, the differences compared to previous forms, methods, and organizers of professional development for teachers in Croatia, and what new competencies teachers have acquired and further developed.

The evaluation of virtual classrooms conducted for the 2018/19 school year, published on the School for Life website in August 2019, presents the results of a survey of teachers, educators, professional associates, and principals who underwent professional development in a virtual environment for eight months (School for Life 2019). Almost 85% of respondents described the benefits of professional development in a virtual environment with the statement 'I completely or mostly agree.' Less than a tenth of the educational staff involved in professional development in a virtual environment participated in the survey.

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Methods

Increasing digitalization and the use of information and communication technology are often seen as opportunities to improve the quality of the educational system, and thus the professional development of teachers. Professional development in a digital environment includes active and collaborative learning, the use of educational resources and model learning, reflection and guidance, and the coherence of professional development.[30] This topic and this research will be based on the paradigm of critical theory and the constructivist approach.[1] Critical theory is a widely represented paradigm in qualitative pedagogical research. Its goal is to clarify the social context of the formation of social facts in order to contribute to the change of social relations. For this purpose, it is necessary to investigate the rules, processes, and mechanisms by which social facts are produced in the given social order. Since it has not developed its own research methodology, it relies on existing concepts: the connection of empirical and hermeneutic procedures and pedagogical action research.[32]

The professional development of teachers in a digital environment can be comprehensively explored from the constructivist paradigm of learning, where learning occurs through continuous collaboration among participants. This can be achieved with the help of digital applications/platforms, such as Moodle or Loomen/Moodle, as these applications can incorporate programmed sequences and videos as multimedia content, thus combining behaviorist and cognitivist learning theories with constructivist ones. Learning that can lead to changes in teaching should be based on the use of models of good practice and reflective discussions on videos of the teaching of professional development participants.[30] It is important to explore the theoretical foundations of teacher professional development and learning and to determine the characteristics of effective professional development of teachers in a digital environment. Therefore, the aim of this research is to discover, understand, and define the role of digital technology in the professional development of teachers in a digital environment and to compare it with previous and common face-to-face professional development models. The research will attempt to identify the problems faced by teachers who have undergone or are undergoing professional development in a digital environment, so that these problems can be avoided in future professional development in both digital and physical environments, and to find ways and strategies for action in future professional development that will be partly aligned with the opinions and needs of educational staff.

The following research questions arise from the goal:

1. How do teachers evaluate the existing face-to-face professional development models?

2. What are the advantages and disadvantages of face-to-face professional development models?

3. What do teachers think about the role of digital technology in professional development?

4. What are the advantages and disadvantages of professional development models in a digital environment?

5. How do teachers see the potential for improving professional development models in a digital environment?

The research participants will be members of the County Professional Council of Primary School Teachers from Bjelovar-Bilogora, Sisak-Moslavina, Međimurje, Zagreb, and Šibenik-Knin

counties. The research will be conducted with six Council members online, using the digital tool Teams, which all educational staff in the Republic of Croatia can access with their AAI@EduHr identity. The respondents were selected because they are accustomed to participating in research processes, publicly publish their work and digital creations, are active in the educational community, have been promoted in their profession, and some were involved in the experimental program 'School for Life.'

Data Collection Methods

This research uses a qualitative research approach as a multi-methodological process aimed at ensuring a deeper understanding of the phenomenon being examined.[33] Data will be collected through a focus group. Members will be informed about the research goal, the purpose of the focus group will be briefly explained to them, they will be informed about data protection, and confidentiality and ethical use of data in presenting the results will be guaranteed. Participation in the research will be based on the principle of voluntariness. Participants will also be asked for consent to audio-record the entire process, which will last from 60 to 90 minutes. Participants will be able to record their responses in prepared protocols. The focus groups will be conducted using a pre-prepared template for a structured interview, which will include hypothetical questions as well as questions about the ideal/best model of teacher professional development. The questions will cover three thematic units with the following example questions:

1. Previous Face-to-Face Professional Development Model (in a physical environment)

- Example questions:

- How satisfied were you with the face-to-face professional development model, i.e., professional development in a physical environment?

- To what extent did the content presented in face-to-face professional development, i.e., professional development in a physical environment, meet your needs?

- What are the disadvantages of face-to-face professional development, i.e., professional development in a physical environment?

2. Professional Development Model in a Digital Environment

- Example questions:

- Describe your satisfaction/dissatisfaction with professional development in a digital environment.

- What are the advantages of professional development in a digital environment?

- What are the disadvantages of professional development in a digital environment?

- How can active and collaborative learning be better implemented in the professional development model for teachers in a digital environment?

3. Comparison of Face-to-Face Professional Development Model (in a physical environment) and Professional Development Model in a Digital Environment

- Example questions:

- What disadvantages of the face-to-face professional development model (in a physical environment) have been resolved in the professional development model in a digital environment?

- If you could create an optimal model of professional development for teachers, what would it be?

- How can almost all teachers' needs for professional development be met?

- How to design, prepare, and conduct professional development for teachers that meets the professional development needs of the largest number of teachers?

Data Analysis Methods

Based on the recorded responses and written protocols, content analysis will be conducted. First, all transcripts will be written using the free trial version of the Express Scribe program/application. The analysis will be conducted based on the transcripts and written responses in the protocols. Participants' responses will be classified according to thematic units and research questions. A two-dimensional analysis will determine the matches and differences in the responses and opinions of the participants. The responses will be thoroughly analysed and grouped to align the participants' responses with relevant scientific and professional literature addressing the topic. The obtained data will be processed using the framework analysis method,[34] which includes five steps: familiarization with the data, establishing a thematic framework, coding the participants' statements, grouping into overarching concepts, and abstracting into categories and connecting and interpreting the results obtained from the research.

Scientific Contribution

Digital technologies and information and communication technologies are an integral part of our society. Professional development of teachers in a digital environment is a novelty in the Croatian educational system as it brings new and innovative opportunities, enhances the quality of the educational process, and ensures better achievement of learning outcomes. Teachers, as direct participants in the professional development process, can help improve existing professional development models with their opinions, attitudes, and experiences. The results of this research will help identify key parameters of professional development for teachers in a digital environment and more reliably predict the behaviors of teachers, the direct participants in professional

development organized by the Ministry of Science and Education and the Agency for Education. These insights can be used to redefine the existing professional development model and standardize its framework.

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Conflicts of Interest

Regarding the publication of this article, the author declares that he has no conflicts of interest.

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