Professional development of educators’ online learning during the COVID-19 pandemic in the Republic of Croatia

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Abstract
Preschool educators work in kindergartens and provide care and education, upbringing, and social and health care of children from the first year of life until they enroll in primary school. During their work, preschool educators are obliged to improve their skills and develop professionally in order to improve the educational process. The COVID-19 pandemic has caused a number of limitations to educators, which in turn affect the quality of the professional development. Modern forms of online learning are available via Internet, digital devices, and various learning platforms. The paper investigates the conditions for educators’ professional development in the online environment during the COVID-19 pandemic in the Republic of Croatia. The aim of the research was to determine the conditions and level of support for online professional learning of preschool educators. The research was conducted using a survey method and the questionnaire was used to assess satisfaction with the conditions of online professional learning of preschool educators and developed for the purpose for this research. The results of this research emphasize the need to examine the possibility of using digital technology and the Internet in online learning of preschool educators. The research improved the field of professional development of preschool educators.

Keywords Conditions of learning · Digital technology · Online environment · Preschool educators · Support for learning

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Introduction

A preschool educator is a professionally qualified person who implements an educational program of work with early and preschool age children and professionally reflects on the educational process. The educational profession is a complex profession that implies continuous professional development, autonomy and responsibility, and educators are expected to have developed various competencies.

Initial education of preschool educators in the Republic of Croatia is carried out at the Undergraduate three-year university study and at the two-year Graduate study. This way, educators acquire the necessary knowledge and competencies to work with children of early and preschool age. According to Article 29 of the State Pedagogical Standard for Preschool Education\(^1\) (2008), educators are obliged to spend 27.5 working hours per week in direct educational work with children, and other work within the schedule up to full time. Other tasks of educators include planning, programming and evaluation of work, preparation of space and incentives, cooperation and counseling work with parents and others, and professional development activities.

Many authors (Fullan 2008; Šagud 2011; Vujičić and Čamber Tambolaš 2017) emphasize the need for professional development, i.e., continuous professional development of educators as a key component of change, i.e., changing and improving the educational process. Modern society needs educators who will be able to adapt to constant change while enriching and expanding their knowledge. Continuing professional development includes the design, selection, and implementation of various forms of learning to improve work, supplement knowledge and strengthen professional competencies. Thus, the educator gets acquainted with new and alternative methods and forms of work, new content, a new view of child development, different ways of encouraging child development, new technology, etc.

Educators need to think about the future to determine what should be done to be relevant and helpful to the society of the future. The education system will be preparing learners for jobs that do not exist today because of emerging technologies, information explosion, and the Fourth Industrial Revolution. The demand for lifelong learning is growing significantly around the world since meaningful jobs require obtaining current and relevant education.

Professional development is based on the concept of lifelong learning and is a continuous obligation in the educational profession. Learning takes place not only in educational institutions, but also in daily interaction and through activities with other people from their environment and beyond, locally and globally. Lifelong learning is conceived in different ways in scientific theory, and the broader approach includes more than workforce training and is implemented in the European Commission’s definition of "all lifelong learning activities undertaken to improve employment-related knowledge, skills and competences" (European Commission 2002, according to Ranieri et al. 2012, p. 761). From a social and economic perspective,

\(^1\) Državni pedagoški standardi (Croatian) (The footnotes are identifying the documents for referencing purposes hereinafter).
lifelong learning is seen as a new educational pattern that involves adult participation in lifelong learning to achieve a sustainable learning society. The premise of lifelong learning is that people constantly update their knowledge and skills to meet the challenges of everyday life and empower them to be able to manage learning that becomes crucial for personal and professional development.

**Croatian and other concepts of educators’ professional development**

Educators of early and preschool children in the Republic of Croatia have the obligation of continuous professional development in accordance with the plan and program adopted by the Ministry of Science and Education. The professional development of educators is regulated by several legal documents. According to Article 29 of the Preschool Education Act\(^2\) (2019), educators are obliged to undergo professional training in accordance with the law, and according to Article 25 of the State Pedagogical Standard for Preschool Education (2008) they have the obligation of continuous professional training in accordance with the plan for education. The National Framework Curriculum for Preschool and General Compulsory and Secondary Education\(^3\) (2010) is a document developed in line with the Recommendation of the European Parliament and of the Council on key competences for lifelong learning which also recommends lifelong learning through eight different competences. According to the Ordinance on the Manner and Conditions of Advancement in the Profession and Promotion to the Position of Educators and Professional Associates in Kindergartens\(^4\) (1997), there are two positions that can advance in the profession if educators have the appropriate qualifications, namely: educator mentor and educator advisor. The conditions of the procedure for acquiring the title of mentor and the title of advisor are elements of evaluating the expertise and quality of educators and success in direct educational work with children of early and preschool age, success in professional pedagogical work and professional development.

The professional development of educators is part of the curriculum of many European countries. In the neighboring Republic of Slovenia, the professional development of educators is not strictly defined. Article 41 of the Kindergartens Act\(^5\) (1996) states that the work obligation of educators includes preparation for educational work, planning and performing educational work, work with parents and participation in the organization of life and work in kindergarten.

In the neighboring Republic of Serbia, the Rulebook on the General Basics of the Preschool Program\(^6\) (2006) lists professional development and various forms of

\(^2\) Zakon o predškolskom odgoju i naobrazbi (Croatian).
\(^3\) Nacionalni okvirni kurikulum za predškolski odgoj i opće obvezno obrazovanje u osnovnoj i srednjoj školi (Croatian).
\(^4\) Pravilnik o načinu i uvjetima napredovanja u struci i promicanju u položajna zvanja odgojitelja i stručnih suradnika u dječjim vrtićima.
\(^5\) Zakon o vrtcih (Slovenian).
\(^6\) Pravilnik o opštim osnovama predškolskog programa (Serbian).
professional development as part of the work of educators, and they have autonomy in choosing the forms and methods of professional development.

Malta in its National Curriculum Framework for All (2012), in a special chapter Professional Development of Teachers, lists teachers as key actors in curriculum implementation. Teachers need to have a wide range of competencies and continuous professional development.

More recent policy in England has focused on implementation of the Statutory framework for the early years foundation stage (2021). The importance of education and teaching within the roles of the workforce has been recognized in the job titles of Early Years Educator and Early Years Teacher because good quality pre-school provision was positively associated with children’s attainment and progress throughout primary school. In order to maintain the quality of pre-school provision, Early Years Educator needs to be professionally trained and professionally developed.

The Swedish Ministry of Education has issued Skollagen 2010: 800 (2010) as a legal document for the whole school system, which in the section on preschool education refers to the function of the preschool institution and the rights of children to be included in the preschool education system. The Curriculum for Preschool Education, Lpfö 18 (2019) deals with the development and learning of children, collaboration with parents and the wider community. Educators are responsible for the care, development and learning of children, curriculum planning and implementation, spontaneous activities and interests of children, and daily activities and routines. Educators need to develop educational content and an environment that encourages children’s development, learning, interest, and curiosity. The institution, i.e., the director, should continuously provide educators with the opportunity to share their knowledge and learn from each other in order to develop the curriculum.

These countries have advice and recommendations for the professional development of educators that are part of the legal documents but are indicative and left to educators to choose from. The opportunity for professional development of educators during the COVID-19 virus pandemic was provided by digital technology because other forms could not even be implemented.

**Digital competence as a condition for the use of digital technology for learning and professional development**

As already mentioned, an effective educational process requires the necessary competencies of educators. They are important in ensuring the achievement of educational goals. Competences are standards in determining whether an educator has the knowledge and skills to perform his/her job-relevant tasks. Strengthening competencies require professional development, which should lead to improved teaching quality.

Digital competence is recognized as one of the eight key competences for lifelong learning needed by all citizens. In the Recommendations of the Council of the European Union on key competences for lifelong learning (2018), digital competence implies the safe, critical, and responsible use of digital technologies. It includes information and data literacy, communication and collaboration, media literacy,
digital content creation, security, problem solving, and critical thinking. Digital competence is a complex competence that consists of numerous areas of knowledge, and requires knowledge, attitudes, and skills to achieve activities in the digital environment. Caena and Redecker (2019) state that digital competencies that every citizen should develop for a successful life in a digital society, breaking the down into five areas, are as follows: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving.

Instefjorda and Muntheb (2015) divide digital competences of teachers into three areas of knowledge: technological knowledge, pedagogical compatibility, and social awareness. Technological knowledge is knowledge about standard digital tools and how those tools can be used. Pedagogical compatibility implies understanding technology as an educational resource, and social awareness focuses on the ability of teachers to negotiate the social aspects of school culture, that is, to know who to turn to for technical or administrative support. A socially aware teacher will be better qualified to anticipate potential problems related to the use of technology and is therefore more likely to achieve successful technology integration. In the online environment, there are more and more opportunities to learn and collaborate with experts at European and global level. Erasmus and eTwinning platforms publish projects in which educators of early and preschool children can be involved and thus develop professionally. In addition to these platforms, there are various groups of experts on social networks (Facebook) who exchange and share experiences from pedagogical practice, and more often online presentations of experts are organized by the Education Agency and various associations and organizations.

In the context of lifelong learning, digital technology is a factor that requires continuous improvement of educators because of the skills needed for its effective use. On the other side, digital technology is perceived as a driver of change, i.e., as a resource that enables innovation processes and supports learning anytime and anywhere. With the help of digital technologies, it is possible to access various learning platforms in the form of applications (Skype, Zoom, Merlin, Microsoft Teams, Microsoft Meet, etc.)

Ferrari (2012) lists seven areas in which teachers can use digital technology. The first area is information management, i.e., finding, retrieving, collecting, and classifying information. The second area is collaboration needed for constructive online participation with others, the third area is communication involving confidentiality and security, the fourth area is content and knowledge creation, the fifth is ethics and responsibility, the sixth is evaluation and problem solving, and the seventh are technical operations to perform tasks through the use of digital tools. These seven areas could provide insight into how teachers use digital technologies in an educational context, managing information, collaborating, and communicating with others, creating new content and solving problems in an ethical and responsible way.

Continuous professional development must provide teachers with the opportunity to collaboratively practice technology and to think and receive feedback. The institution, i.e., its leadership, should provide educators with space and time for communication and exchange of experiences.

Various studies (Ferrari 2012; Lasić-Lazić et al. 2017; Kuzminska et al. 2018; Ally 2019) have been published in the relevant literature in the field of online learning.
related to teachers’ self-assessment of functioning skills with new technology. The results of this research show that teachers do not trust their digital competencies and their use in professional development. However, there is a positive attitude of teachers toward the integration of new technology into their work. Teachers are motivated and strongly express a desire to improve digital competencies, as well as to change the educational environment through the opportunities offered by e-learning (Kirova et al. 2012). A purposeful and systematic survey (Digital National Alliance & Gallup International 2018) on the level of digital competence of educators in Bulgaria shows the need for professional development in this area. More than half of the surveyed educators need additional information about the possibilities of introducing digital technologies in learning. Teachers with more experience in the field of education feel unprepared unlike their younger counterparts. Teachers who confidently and deliberately use digital technologies say they need more information on the topic, and every other teacher says he/she doesn’t feel confident enough and rarely use digital technology.

Ally (2019) draws attention to the need of improving the quality of educational training of pedagogical professionals in the context of the application of information and communication technologies in training and work in the digital environment. Training for digitally competent teachers for the future may take place in formal teacher training programs or in professional development undertaken throughout lifelong learning.

Social constructivism (Vygotsky 1978) emphasizes the contextual importance of social interaction that can improve professional development practices. This research also seeks to examine the extent to which professional learning through digital technologies is covered by constructivist characteristics (activity of an individual learner, cooperation with colleagues, support of more experienced and competent, positive learning environment). The research aims to determine how educators in the Republic of Croatia view the professional development supported by technology during the Covid-19 pandemic and how much support they expect from the educational institution in which they work. The value of this topic is reflected in the ultimate goal of quality early and preschool education, and that is the education of a satisfied and successful child.

Education must prepare teachers to educate learners to function effectively in the modern world. Countries around the world are investing in teacher professional development to ensure that teachers are prepared for the future. Professional development will be increasingly important for teachers in the digital age in order that they may stay abreast of quality and flexible education strategies for more sophisticated learners, generations of learners who are technology literate and have digital experience. A foreseeable barrier to innovation of this type could be the teachers’ lack of functioning skills with this new technology.

Research methodology

Aim, problem, and research hypotheses

The paper investigates the conditions for the professional development of educators in the online environment during the COVID-19 pandemic in the Republic of
Croatia. The aim of the research was to determine the attitudes of educators about digital competencies and technological conditions for professional development as well as the level of support they have received from kindergarten during the COVID-19 pandemic in the period 2020/2021. The research problem includes the quality level of existing technological conditions and digital competencies of educators in the online environment of professional learning modern forms. Independent variables in the research are sociodemographic characteristics of respondents (gender, age, seniority, position), while dependent variables include satisfaction with working conditions, respectively, educators’ attitudes about technological conditions for professional development and the level of personal digital competencies in the online environment during the COVID-19 pandemic. Two hypotheses follow from the goal and problem of the research:

**H1** Significant satisfaction is expected with the technological conditions of professional development and the level of digital competencies of educators with fewer years of work experience.

**H2** Older educators expect more significant support in the application of ICT technology in professional development.

**Procedure, instrument and research participants**

For the data collection, the questionnaire was used to assess satisfaction with the conditions of online professional learning of educators. The questionnaire was a part of a larger study by the Agency for Quality Assurance in Education of the Republic of Croatia because it identified difficulties and needs to support students and educators during the Covid-19 pandemic. For the purposes of this survey for preschool educators, 32 questions were used divided into several parts. The first part of the questionnaire was addressed to the demographic characteristics of the research participants (gender, age, length of service, position). The second part of the questionnaire consisted of scales. The first scale referred to the technological conditions of professional development in the online environment during the COVID-19 pandemic. The second scale was on the quality of professional development forms, the third one was on the quality of support for professional development of educators in the online environment during the COVID-19 pandemic. The fourth scale referred to the benefits of professional development in the online environment, and the fifth one to the future. A Likert scale of one to five (1- very dissatisfied to 5- very satisfied) was used and each statement contained three to five questions. Below is a Table 1 listing the reliability coefficients (Crombach alpha) for each question group as well as for the overall scale. Reliability coefficients were calculated for the part of the questionnaire with the Likert scale. The Table 1 shows quite good levels of reliability, except for the subscale *Socio-psychological aspects of professional development*

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7 [https://www.azvo.hr/hr/?option=com_chronoforms5&chronoform=covid19-studenti](https://www.azvo.hr/hr/?option=com_chronoforms5&chronoform=covid19-studenti)
| Subscale (group of questions)                                                                 | Number of particles | Reliability coefficient (Cronbach α) |
|-----------------------------------------------------------------------------------------------|---------------------|--------------------------------------|
| Technological conditions of professional development in the online environment during the COVID-19 pandemic | 5                   | 0.66                                 |
| Quality of online professional development during the COVID-19 pandemic                         | 5                   | 0.81                                 |
| Quality of professional development support to educators in the online environment during the COVID-19 pandemic | 3                   | 0.78                                 |
| Burdening educators with professional development in the online environment during the COVID-19 pandemic | 3                   | 0.74                                 |
| Socio-psychological aspects of professional development in the online environment during the COVID-19 pandemic | 4                   | 0.32                                 |
| Benefits of professional development in an online environment                                   | 6                   | 0.91                                 |
|                                                                                               | 26                  | 0.89                                 |
in the online environment during the COVID-19 pandemic, Cronbach $\alpha$ of which was 0.32. However, the questionnaire as a whole has a very good level of reliability and thus this result should not be a problem.

The research was conducted in April 2021 on a random sample of 213 educators of preschool children from the Republic of Croatia. The sample was chosen according to the volunteer educator. The research was conducted using a survey method, where educators were guaranteed anonymity. A possible limitation of the research regarding the sample could be in the fact that the research included digitally literate educators because the survey was available online on social networks and various applications on mobile phones and computers (Messinger, WhatsApp, Viber, Facebook). This can be reflected in greater satisfaction of educators with digital competencies. This can be called a pilot study. Further study can be extended to larger sample.

For the needs and scope of work, the focus is on the results of educational assessment of technological conditions of professional development in the online environment, the quality of online professional development during the COVID-19 pandemic, educators’ views on support, benefits of online learning and future educators’ professional development. Based on these data, an insight will be gained into the satisfaction of educators with the technological conditions of professional learning and development, the need for support and their recommendations for the use of digital technology for professional development.

The obtained results open space for thinking about quality strategies of politicians, ministers, principals, and professional associates in order to further encourage and support the online professional development of educators.

The data obtained from the research were processed using the statistical program for computer data processing (SPSS) by descriptive and inferential statistics procedures using the Kruskal–Wallis test for independent samples.

### Research results

#### Sociodemographic data

The survey was conducted with 213 preschool educators in the Republic of Croatia, and Table 2 shows that most of the participants in the survey are 64 (30.2%) educators between 41 and 50 years of age.

| Age          | $N$ | %    |
|--------------|-----|------|
| 20–30        | 44  | 22.6 |
| 31–40        | 54  | 13.6 |
| 41–50        | 64  | 34.0 |
| 51–60        | 40  | 17.9 |
| 61 and more  | 11  | 12.3 |
|              | 213 | 100  |
The largest number of educators participating in the survey, 72 (34.0%), have 11–20 years of work experience, and the least number of educators, 27 (12.4%), as shown in Table 3, with 30 or more years of experience.

According to the status in the position, significantly, most of the educators are not in the process of promotion, 155 (73.1%), and the least number of participants in the research are trainee educators, 11 (5.2%), which is shown in Table 4.

172 (81.1%) educators used the online environment for professional development.

### Descriptive statistics of selected dimensions of examined variables

In matters related to educators’ satisfaction with the technological conditions for professional development in the online environment during the COVID-19 pandemic, Internet access (56.4%) and access to communication and learning platforms (54.1%), most educators express a great satisfaction. Satisfaction decreases with access to literature from home, which is still rated as satisfactory (33.1%) and very satisfactory (33.1%). The level of personal digital competencies was assessed by educators as mostly very satisfactory (40.7%) and satisfactory (40.1%), which is shown in Graph 1.

Kindergarten technological support was rated on a scale from a very unsatisfactory support (19.8%) to very satisfactory (23.3%), which can be seen in Graph 2.

Educators are satisfied with the quality of online professional development during the COVID-19 pandemic when the teaching performance is organized as lectures and presentations (43%) and workshops (35.5%). 41.3% of educators are satisfied with the quality of learning materials, and 40.7% of educators are satisfied with the possibility of interaction with lecturers in the online environment. Educators as significantly unsatisfactory (8.1%) assess the level of support for professional development.

#### Table 3  Number of educators by years of service

| Years of service | N   | %    |
|------------------|-----|------|
| do 5             | 48  | 22.6 |
| 6–10             | 28  | 13.6 |
| 11–20            | 72  | 34.0 |
| 21–30            | 38  | 17.9 |
| 30 and more      | 27  | 12.4 |
|                  | 213 | 100  |

#### Table 4  Educators’ position

| Position          | N   | %    |
|-------------------|-----|------|
| Trainee educators | 11  | 5.2  |
| Educators         | 155 | 73.1 |
| Educators mentor  | 28  | 13.2 |
| Educators advisor | 19  | 8.6  |
|                  | 213 | 100  |
development from kindergarten to satisfactory (25.6%) and very satisfactory (10.5%). Significantly, more educators consider this support to be moderately satisfactory (36.6%), which can be seen in Graph 3.

Educators express satisfaction (36.6%) and significant satisfaction (25.0%) with the possibilities of individual approach to professional development, but Graph 4 shows dissatisfaction with the interest of kindergarten for the needs of educators in
the online environment of professional development, where they assess their attitude as mediocre (28.5%), poor (25%), while 19.2% of educators are satisfied and 13.4% of educators are significantly satisfied.

Positive attitude to professional development in the online environment, i.e., spatial and temporal availability, is assessed by educators as very satisfactory (30.8%), satisfactory (24.4%), and mediocre (31.4%). The comfort of working from home is very satisfactory (49.4%) as well as working at your own pace (41.3%). Educators are moderately satisfied (29.1%), satisfied (35.5%), and very satisfied (28.5%) with the availability of content and state great satisfaction (46.5%) in raising personal digital competencies while participating in online learning. They are also significantly satisfied with flexibility in online learning (46.5%).

In the future, educators would be most strengthened and motivated by the support of the kindergarten management in organizing and conducting online learning (58.0%), the support of the home institution in the flexibility of organizing time and space for online learning (47.6%), and the support of the home institution in accessing digital learning platforms (43.9%). Among other supports, educators mention organized IT support (available IT person for help in distress), (35.4%) and an external organized course for the improvement of digital competencies (31.6%). This answer had the possibility of multiple choices.

**Results of Kruskal–Wallis test for independent samples**

Prior to performing the Kruskal–Wallis test analysis, values of the independent variables—age and seniority of the educator—were recorded for the purpose of obtaining new variables. The Cronbach’s alpha reliability coefficient was determined for all scales ($\alpha = 0.765$). In order to analyze the significance of differences between respondents with regard to age, length of service and position, an analysis was performed with the Kruskal–Wallis test for independent samples on selected variables. No variables with statistically significant differences were found according to the position of the educator, but, according to the age and length of service of the educator, such variables were found in judging the level of technological conditions for professional development in relation to the length of service of educators, judging the level of support for professional development.
Table 5 Judging the level of technological conditions for professional development in relation to the work experience of educators

| Technological conditions          | Work experience of educators | N  | M_{Rank} | χ²    | P* |
|----------------------------------|-----------------------------|----|----------|-------|----|
| Level of digital competencies    | Up to 10 years              | 69 | 119.42   |       |    |
|                                  | 11–15 years                 | 73 | 112.41   | 9.865 | .007|
|                                  | 16 and over years           | 71 | 89.37    |       |    |

*Kruskal–Wallis test*

Table 6 Judging the level of support for professional development in relation to the age of educators

| Support for professional development                         | Age of educator | N  | M_{Rank} | χ²    | P* |
|-------------------------------------------------------------|----------------|----|----------|-------|----|
| Possibility of individual online access to professional learning | 20–40          | 89 | 91.64    |       |    |
|                                                             | 41–50          | 71 | 120.22   | 10.260| .006|
|                                                             | 51–65          | 53 | 115.08   |       |    |
| Kindergarten management support in organizing and conducting online learning | 20–40          | 89 | 95.11    |       |    |
|                                                             | 41–50          | 71 | 115.00   | 7.892 | .019|
|                                                             | 51–65          | 53 | 116.25   |       |    |
| Organized IT support                                         | 20–40          | 89 | 118.67   |       |    |
|                                                             | 41–50          | 71 | 98.50    | 7.968 | .019|
|                                                             | 51–65          | 53 | 98.78    |       |    |

*Kruskal–Wallis test*

and in judging the level of support from the management of the kindergarten in organizing and conducting online learning in relation to the work experience of educators.

Table 5 shows the differences in the variable levels of digital competencies in relation to the length of service of educators and highlighted a statistically significant difference between educators up to 10 years of work experience who have a significant level of digital competencies and educators with 16 or more years of experience showing lower level of digital competencies ($\chi^2 = 9.865, P = 0.007$).

A statistically significant difference between respondents with regard to age was found in the level of support for professional development in the online environment. Table 6 shows the differences in the variable possibility of individual approach to professional development where educators between 41 and 50 years use this option significantly more than educators between 20 and 40 years of age ($\chi^2 = 10.260, P = 0.006$). In the variable support from kindergarten management in organizing and conducting online learning within the institution, it can be seen that educators from 51 to 65 years of age express their satisfaction with the support the most, and educators between 20 and 40 years of age are not satisfied with the support ($\chi^2 = 7.892, P = 0.019$). A statistically significant difference between respondents with regard to age was found in the variable organized IT support (available IT professional person for help in distress), where educators between 20 and 40 years of age express their satisfaction with support the most, and educators between 51 and 65 are significantly dissatisfied ($\chi^2 = 7.968, P = 0.019$).
Table 7. shows that a statistically significant difference between respondents with regard to work experience was found in the variable support of the parent institution in access to digital learning platforms (Zoom, Teams, Meet, etc.) where educators up to 10 express their satisfaction with significantly higher support years of service, and educators aged 16 and over significantly younger ($\chi^2 = 9.348$, $P = 0.009$). The variable Organized IT support shows the difference in the assessment of educator satisfaction where again educators up to 10 years of work experience express a significantly higher level of satisfaction with organized IT support as opposed to educators with 16 and more years of work experience ($\chi^2 = 8.314$, $P = 0.016$).

### Discussion

The need for research is reflected in the view that "the participation of every educator in the process of lifelong vocational education is his obligation and responsibility, not the possible choice of ambitious individuals" (Šagud 2011, p. 271) and in supporting new forms of learning and professional development of educators that are developing in the online environment. Online learning supports multiple avenues for social interaction with other educational professionals across the nation and, indeed, the globe while allowing the individual learner to adapt the content, methods, and strategies to her/his specific context (Parsons et al. 2019). Therefore, online learning is both an individual and a social component of the professional development of educators.

Study results Lasić-Lazić et al. (2017) and Kuzminska et al. (2018) show that educators do not trust their digital competencies but have a positive attitude toward the integration of new technology into their work, it gives hope that educators will develop their digital competencies and improve professionally. Study results Guillén-Gámez et al. (2021) showed that there are differences in the level of knowledge and use of digital technology among educators and that the age variable has an impact on the level of digital competence. The results of this research conducted in the Republic of Croatia during the COVID-19 virus pandemic confirmed the hypothesis that educators with fewer years of service show significantly more satisfaction with the technological conditions of professional development and the level
of personal digital competencies. Internet access and access to communication and learning platforms were analyzed, where significantly more educators express great satisfaction. There was a statistically significant difference in the level of managing in the online environment of educators with up to 10 years of work experience and those with over 16 years of work experience ($\chi^2 = 9.865, P = 0.007$). The result can be justified by the fact that younger educators are more exposed to digital content, have practiced their digital competencies since childhood, which made them get used to and manage better in the online environment. Zygairis-Coe and Swan (2010) point out that young people today are connected through digital technology, and most of them have been exposed to the use of the Internet and digital technology all their lives, including CDs, iPods, video games, mobile phones, tablets, and computers. Teachers need to update their competence profiles for future challenges. Twenty-first century competences can be seen as necessary to navigate contemporary and future life, shaped by technology that changes workplaces and lifestyles. They underscore new skills, but also lay new emphasis on old ones, thus equipping individuals for new ways of thinking, ways of working, tools for working and living in the world (Caena and Redecker 2019).

The results of the research confirm that educators of higher position (mentors, counselors) use online environment for professional development more- out of 18 educators of counselors who participated in the research, all use online environment for professional development, as well as 28 educator mentors. Educators who have not been promoted to a professional position use online environment slightly less (93.9%). Progression in the profession can be associated with the motivation of educators, and Lukaš and Mušanović (2020) emphasize the motivation for work as an important determinant of the work of educational professionals and connect it with the personality of educators. Babić (2014) emphasizes that the intrinsic motivation and activity are the drivers of cognition, and thus of learning and professional development. Kirova et al. (2012) in their research also state that educators are motivated and strongly express a desire to improve their qualifications related to digital competence, as well as to change the educational environment through the opportunities offered by e-learning. Exploring the professional development of educators in Australia, Scott (2010) points out that the educators who have a positive attitude toward learning and a strong motivation to learn, experience their learning strongly linked to maintaining their professionalism and a high-quality educational process and pedagogical practice. Motivation, trust, attitudes and beliefs are key drivers for achieving effectiveness in professional development. According to Šagud (2011), educators’ motivation for continuous professional progress is related to the amount of autonomy, i.e., the right to make and verify professional decisions in organizing and conducting certain pedagogical actions. It is precisely the autonomy that has been more pronounced during the COVID-19 pandemic because educators approach different learning platforms and independently seek topics and activities of their own interest.

A statistically significant difference between research participants regarding age was found in the level of support for professional development in the online environment in the variable possibility of individual approach to professional development, where educators between 41 and 50 years of age significantly use
this opportunity more than educators between 20 and 40 ($\chi^2 = 10.260, P = 0.006$). As education progresses, learning will be adaptive and individualized to meet the needs of individual learners. Learning will move toward individualization and learner-centeredness because of artificial intelligence and learning analytics. Emerging technologies will make learning in the future adaptive and more individualized because of the use of smart learning technologies (Ally 2019). The results of the Powell and Bodur (2019) study show that teachers are more satisfied with professional learning when it is based on their real needs and interests. Gallego and Caingcoy (2020) state that aligning the professional learning and development of kindergarten teachers with their professional and competent needs is vital for ensuring effectiveness in teaching children which can be explained by their professional growth.

The level of online professional development quality during the COVID-19 pandemic is the next category that was researched, and the variable of online professional development through lectures, presentations, and workshops was significantly assessed as the highest quality form of professional learning in an online environment. This form of professional learning is most common in contact education for educators. However, research has shown that this form of professional development is not sufficient. Vrasidas and Glass (2007) point out that several studies have shown that a combined approach to the professional development of educators, combinations of contact workshops and online interaction can ensure the sustainability of the model for continuous development of educators. Scott (2010) cites the form of one-way workshops without other accompanying activities as one of the main critiques of professional development programs in his research of professional development using the Internet and digital technology. In addition to workshops, the author also suggests support and the possibility of sharing various contents, discussing activities with experts and exchanging resources with other educators. Such combined models of professional development can serve the needs of today’s educators much better.

Furthermore, Powell and Bodur (2019) in their study of educators’ perceptions of the design and implementation of online teacher professional development experience state several principles of effective online professional development:

- relevancy refers to addressing teachers’ individual professional learning needs to help solve actual problems, and relevancy may also reflect teachers’ career stages and learning needs
- usefulness refers to the value and helpfulness of online professional development through its ability to address teachers’ needs or solve problems regarding practice
- interaction and collaboration are the key for adult learners because these features promote social aspects of learning through engagement in learning communities
- authentic tasks and activities can enhance effectiveness by reflecting context and relating directly to teacher practice through real-world classroom situations
- reflection helps teachers evaluate how newly acquired information relates to their practice. Thus, reflection may occur in groups as peer reflection in professional learning communities or individually as self-reflection.
Zygairis-Coe and Swan (2010) state that, in addition to educators’ knowledge of
digital technology and access to technology, support is an obstacle to online pro-
fessional development. The educator is provided with a different learning paradigm
on the Internet, individually and in collaboration which requires support. Internet
access, software, maintenance, content updating, key staff training and ongoing sup-
port from network managers, communication with key stakeholders, evaluation,
ongoing support to participants (even after completing some form of learning) and
dissemination of results are important designing and implementation components of
professional learning using digital technology and the Internet. Effective design and
maintenance of a large community of professionals require financial resources, pro-
fessional support, internal support, quality of content, technology, resources, time
and continuous updating of learning content and technology.

As an advantage of professional development in an online environment, the most
prominent is the comfort of working from home as well as working at your own pace
and the availability of content. Online professional development of educators meets
the professional needs of educators due to their flexibility, availability, and access-
sibility. Parsons et al. (2019) in the results of their research they state that many
factors made the online professional development beneficial, especially the ability to
access the information at any time and the ability to complete the professional devel-
opment at their own pace. Because of the flexibility that online professional devel-
opment affords, participants are able to process content at their own pace and revisit
it as needed. Professional development that can meet today’s demanding schedule of
educators, and which uses quality content and resources available to educators from
anywhere and at any time as well as ongoing support can stimulate educators’ inter-
est in professional development.

The results of the research show that in the future, educators would be most
empowered and motivated by the support of the kindergarten management in organ-
izing and conducting online learning (58.0%). There is a statistically significant dif-
fERENCE in the age of the educators in this variable. Older educators show statistically
significant quality of IT support for kindergartens and educators between 20 and
40 years of age are not satisfied with the support ($\chi^2 = 7.892, P = 0.019$). Statistically
significant difference between respondents regarding work experience was found in
the variable parent institution support in access to digital learning platforms (Zoom,
Teams, Meet, etc.) where educators up to 10 years of work experience express their
satisfaction with support, and educators with 16 and more years significantly less
($\chi^2 = 9.348, P = 0.009$). The variable organized IT support shows the difference in
the assessment of educators’ satisfaction, where again educators up to 10 years of
work experience express a significant level of satisfaction with organized IT sup-
port, as opposed to educators with 16 or more years of work experience. ($\chi^2 = 8.314,
P = . 016$). A statistically significant difference between respondents with regard to
age was found in the variable organized IT support (available IT professional per-
son for help in distress), where educators between 20 and 40 years of age express
their satisfaction with support the most, and educators between 51 and 65 years of
age are significantly dissatisfied. ($\chi^2 = 7.968, P = 0.019$). From the results obtained
it can be concluded that younger educators, i.e., educators with fewer years of work
experience and more developed digital competencies are more satisfied with their
ability to access digital learning platforms and IT support, but they need more support from the kindergarten management. Spiteri and Rundgren (2017) state that continuous professional development must provide teachers with the opportunity to collaboratively practice technology and to think and receive feedback from others. The leadership of the institution should provide teachers with space and time to communicate and share experiences. Cooperation implies the teacher's actions and attitudes for dialogue and interaction in social contexts and professional communities; it is viewed as an aspect that is most in need of development in kindergarten organizations. Reısoğlu and Çebi (2020) emphasize the need for collaboration and the constructivist paradigm of learning in their research they put the main focus of the training was to assure that teachers worked with peers who had different kinds of experience about digital technologies. In this context, they were given activities which allowed them to participate actively and learn through experience. Members of the professional team should create a stimulating environment for educators in which they will largely learn by acting, participating, and thinking about their practice, warning them of mistakes, but also encouraging them to see and correct them independently. The role of the institution is to provide an atmosphere conducive to continuous adult learning and in which the needs of adult learning can be met. Vujičić and Čamber Tambolaš (2017) in their research identify the dimensions of the culture of the institution that support the professional development of educators. The surveyed educators assess cooperation with the principal, professional associates and other colleagues, equality in mutual relations, mutual support, assistance and encouragement in innovating educational practice and team realization of activities as the best segments of relations in early childhood institutions. Ally (2019) conducted focus groups and interviews with education experts from six countries to identify the forces shaping education in the future and the competencies required by the digital teacher to function effectively. The study identified necessary competencies of digital and online teachers who must adapt to the Internet and digital technologies of the future. Reısoğlu and Çebi (2020) indicated that teachers should be trained for information and data literacy, communication and collaboration, digital content creation, safety, and problem solving. The study revealed that it is necessary for the digital competence trainings to be implemented effectively in which teachers collaborate on digital issues regardless of their previous experience.

The results of the research showed several features of professional development of educators using digital technology during the COVID-19 pandemic. One can single out individualized approach to professional development, time required, emphasized need for support of kindergarten, leadership, and IT professionals. The obtained research results are significant considering the extent to which educators' attitudes toward professional development using digital technology and the Internet have the potential to influence educators' practice and future research. Given the extent to which educators cited the need for interaction and collaboration with professionals, colleagues, and kindergarten management, they reiterated the claim advocated by many studies that social elements serve as a binding force of professional development (socio-constructivism). The results of this research created several implications and shaped recommendations for the future organization of professional development of educators. These implications and recommendations can
affect a number of educational stakeholders, including current educators, curriculum experts, policy makers, and students. Perhaps the most significant implication of this research on the professional development of educators using digital technology and the Internet is the possibility of a future combination of network and contact professional learning and development with the ongoing support of kindergarten management. The professional development of educators depends not only on internal (personal) factors, but often on external ones as well (laws, current political and social situations, principals, culture of the institution, professional team), which often do not act in their favor.

Conclusion

The results of this research emphasize the need to examine the possibility of using digital technology and the Internet in online learning of educators in order to better understand the impact of this form of learning on pedagogical practice of educators and curriculum of early and preschool education.

The research improved the field of professional development of educators with empirical evidence that contributes to the design and implementation of professional development of educators using digital technology and the Internet, based on educators’ perception of digital competencies and technological conditions for professional development leadership. This contribution helps to expand the theoretical knowledge of the professional development of educators, to encourage future research, and to form practical experiences for improving the practice of educators and the curriculum of early and preschool education.

Although research has identified limitations that affect the success of professional development using digital technology and the Internet, more research is needed to understand the complexity of educational practice and the perception of how professional development can help educators better understand the needs of twenty-first century children.

Educators are facing changes in society, technology, new living conditions imposed by the COVID-19 pandemic. Given that sophisticated technology, social networks, the ability to work from home and the comfort of working with technology is present in the twenty-first century, educators explore their professional growth through the Internet and digital technology but also increase their technological expertise. Technologically facilitated professional development generates two positive outcomes, professional learning and mitigation of the differences between generations of educators and generations of technologically sophisticated children.

Despite the unsystematic support of the Ministry of Science, Education, the Agency for Education and the leadership of educational institutions in organizing and conducting professional development using digital technology, a large percentage of educators, research participants (81.1%) have strengthened their digital competencies during the COVID-19 pandemic with various tools, which has improved their professional development and raised the level of e-learning. In the post COVID-19 period, the professional development of educators using digital technology should be organized in combination with contact forms with
systematic support, planning, supervision and ensuring a sufficient amount of time by the management of the kindergarten.

Educational institutions need to be more innovative, creative, and efficient, which implies a number of changes, including changes in development processes. A changing society requires institutions that adapt and revise their coherence, acting according to the needs of the environment. Innovation, a feature of creative and successful institutions, has become a widespread need and a problem that is constantly being examined at different levels (at the level of society, institutions, and individuals) and with different strategies. Professional development in institutions must therefore change its retroactive nature and instead force proactive actions that are a step ahead of social change and the emergence of new technologies.

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**Data availability** The data presented in this study are available on request from the corresponding author.

**Code availability** Not applicable.

**Declarations**

**Conflict of interest** The authors declare no conflict of interest.

**Ethical approval** Participation was voluntary and anonymous, and all participants gave their written consent. We obtained ethical approval for our study from the relevant research ethics boards in institutions where we performed data collection. The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the Faculty of Kinesiology. The research was focused on ethical standards and the protection of respondents in accordance with the Code of Ethics of the Committee on Ethics in Science and Higher Education (https://mzo.gov.hr/istaknute-teme/nacionalna-vijeca-strucna-i-radna-tijela-i-povjerenstva/odbor-za-etiku-u-znanosti-i-visokom-obrazovanju/326).

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