

Improving the professional development of teachers through learning management systems

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Abstract

At the core of professional development of teachers, it is sought to understand that professional development is in teaching teachers how to learn and transform their knowledge into practice, all with the aim of developing student abilities. The increasing need for online education makes us wonder what are the most effective practices for facilitating professional development using online platforms. Online professional development is defined as formal professional learning that is fully realised online (online), all with the aim of more efficient changes in the knowledge, behaviour and practices of teachers. The efficiency of this type of teacher education can be reflected in increased cooperation with internal and external associates, increasing the ability to think about their practice, as well as the implementation of teaching practices learned through learning management systems. In order to determine the satisfaction of the current way of professional development of teachers, a survey was conducted among teachers. Problems faced by teachers during their professional training were identified, as well as obstacles that lead to reduced use of online platforms for their education. The obtained research results will serve to improve the professional development of teachers, promote an online system for learning management, so that every teacher has access to online education and topics that they will be able to perfect when they want and at the pace they want.

Keywords: *professional development, teacher, learning management system, LMS, professional development*

1. Introduction

Until recently, when we heard the word training, training or upskilling, we would think of a

classroom where the lecturer lectures in front of students. In general, learning (training or training) is a process that requires a lot of time, resources and money. For large companies, conventional learning (e. g. on-the-job training) can be unprofitable and unsustainable, so many prefer methods that rely on e-learning. E-learning finds its basis in a dynamic environment and constantly changing trends, requires users and regulations that need to be constantly adapted. Given the circumstances, it is a challenge to organise conventional education for a large number of employees because it could disrupt the business routine. Therefore, e-learning is imposed as an adequate solution. E-Learning is a process that, in addition to *the* goal of improving the existing and acquiring new knowledge, does not have many points of contact with the traditional way of learning. Education in an online environment offers learning opportunities anytime, anywhere, on any device with Internet access. Consequently, today there are various systems to support learning in a virtual environment. These systems are designed in such a way that through courses they offer content that students, i. e. users, will adopt while having an insight into their activities and progress. Online learning or training has now become popular, especially at a time when online connectivity is more prevalent in-person dating. As companies, instructors and students see the benefits of virtual training, the eLearning market will continue to grow.

This paper will present the application of the Learning Management System. A theoretical basis on learning management systems as a problem solving tool will be offered. A survey of teachers will also be conducted to assess the current state of professional development, what shortcomings and advantages are present, as well as a way to improve the professional development of teachers.

2. Professional development of teachers

Although there are different definitions of professional development, Lauer et al. (2014) A number of authors have agreed that professional development refers to adult education, and is designed to contribute to positive changes in teacher beliefs, knowledge, skills or behaviour. Teaching as a professional act requires from teachers practical knowledge, conceptual understanding of education, but also the ability to interpret and form critical thinking about existing knowledge (Winch et al., 2015). In the era of education reforms, many see education and professional development of teachers as a key factor for improving education. (Hawley, Valli, 1999). According to Borko (2004), most training programmes offer fragmented and intellectually superficial seminars. The low quality of professional training prevents teachers from implementing new curricula and educational reforms in the right way. The need for lifelong learning and continuous professional development of teachers leads to the creation of new ways of professional development, so that all teachers have equal opportunities for professional growth and development. The overcrowded schedule of teachers, their obligations as well as the unavailability of all resources in certain geographical areas, stimulated the creation of an online environment for the professional development of teachers. On the other hand, the rapid development of technology as well as the COVID-19 pandemic has also accelerated the need for online training. Furthermore, online formats offer additional opportunities for individualised mentoring and support within online communities of practice, and the asynchronous, textual and dialogical character of online teaching has the potential to engage teachers in rich and constant thinking about their practice. (Dede et al., 2009; Borko et al., 2010). Professional training enables educators to upgrade their existing competences. In addition, they provide a wide range of interactive activities aimed at improving professional knowledge, contributing to their personal, emotional and social growth (Wasserman, Migdal, 2019). Kuka (2012) states that professional training takes place outside the formal education system. Their purpose is for students to acquire different knowledge and skills.

There are different types of online professional training, which are: synchronised, synchronised and hybrid online training. (Bates et al. . 2016)

- Synchronised online training takes place in real time. These are mostly distance education offered by universities in the form of webinars on a specific topic, as well as virtual training.
- Synchronised online training takes place at different times for different participants. These are mostly websites where teachers share their ideas with each other, as well as websites where external experts share their professional learning tools, videos and various resources. The main difference between asynchronised learning and synchronised learning is that the teacher chooses what, how, and when to learn.
- Hybrid online training includes courses or workshops that require virtual collaboration or the completion of other online tasks between sessions. These hybrid options can use synchronous or asynchronous online tools, depending on the specific goals of personal sessions.

One example of professional development in the digital environment is present on the eTwinning platform. This type of teacher training was started by the Agency for Mobility and EU Programmes, where teachers have the opportunity to participate in several days of online education on various topics. In the neighbouring Republic of Croatia, teachers are able to participate in the training of European Schoolnet. According to Klemše (2021), the Ministry of Science and Education of the Republic of Croatia conducted an experimental programme „School for Life“ by designing education in virtual classrooms using the Loomen platform. The education included 48 primary schools and 26 secondary schools, where teachers actively participated in training in virtual classrooms. Unfortunately, in Bosnia and Herzegovina, such a way of training has not yet been devised by the Ministry.

With the development of digital competences for learning and teaching, educators will more easily use online available sources, tools and applications for professional development and in everyday work and changing/improving pedagogi-

cal practices. CARNET developed a framework of digital competences for three groups of e-Schools users, in three dimensions, and developed them by areas and for the initial, intermediate and advanced level (CARNET, 2016)



Picture 1. Digital competence framework for e-School users

The OECD Education 2030 project identified three further categories of competencies, the so-called. “Transformative Competencies” which together address the growing need for young people to be innovative, responsible and aware.

1. Creating new values – to be ready for 2030, people need to think creatively, develop new products and services, new jobs, new processes and methods, new ways of thinking and living, new business models and new social models.

2. Reconciliation of tensions and dilemmas – to be ready for the future, individuals need to learn to think and act in a more integrated way, taking into account interconnections and interrelationships between contradictory or incompatible ideals, logic and position from both a short-term and a long-term perspective. In other words, they need to learn how to be systemic thinkers.

3. Taking responsibility – indicates a sense of responsibility, morality and intellectual maturity by which a person can think about and evaluate their actions in light of their experiences, personal and social goals, what they have learned and said, and what is right or wrong. Ethical conduct involves asking questions related to norms, values, meanings and limitations, such as: What should I do? Was I right to do that? What are the limits/limits? Knowing the consequences of what I did, should I have done it?

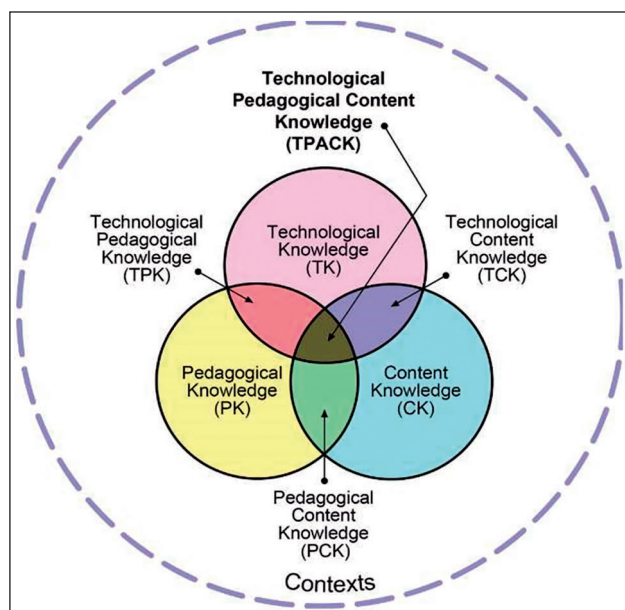
The Partnership for 21st Century skills is a collaborative organisation of government and enter-

prises that have defined a framework for developing skills, attitudes and preferences to succeed in the workplace and in society of the 21. century. They list three types of competences: (1) learning skills (creativity and innovation, critical thinking and problem solving, communication and cooperation), (2) literacy skills (information literacy, media literacy) and life skills (flexibility and adaptability, initiative, social and intercultural abilities, productivity and responsibility). (Tecnologico de Monterrey). To apply the components of the new education, Vengas and sar. (2021) Recommended to go beyond developing thinking in class, to computer thinking using robotics and programming and developing student skills through emotional management/management. Van Laar et. al. . (2017) provide a systematic overview of the correlation between the 21st century competence framework and the digital competence framework. Studies have described STEAM competencies that are being developed in the robotics laboratory. Although it is expected to develop competencies among students, it is still necessary to create models that will satisfy teachers and school management, and provide the necessary resources to strengthen educational institution. As stated by Van den Hurk et. al. (2019) In its theoretical model, there are three types of factors that can affect persistence in STEM learning, namely:

- environmental factors;
- school-level factors;
- factors at the student level.

Schools need to make better decisions to equip the environment for Gen Z pupils with a recreational, comfortable, sustainable and accessible space. Looking at all the trends in learning, it means that teachers must be able to integrate technology into their teaching. An approach that requires teaching is needed in terms of the interaction between what teachers know and how they apply what they know in interesting situations in their classroom. Modern learning requires 21st century skills that include communication and collaborative skills and the use of information technologies in learning. The development of learning through ICT¹ integration significantly contributes to the level of student pedagogical practice. Teachers are also required to possess IT literacy skills in teaching, with different methods and approaches in the classroom. Recent

research explains that the success of learning in the 21st century includes understanding of matter and content, teaching methods, and the integrated use of information technologies.



Picture 2. Koehler's technical - pedagogical - content framework

Koehler devised a technical-pedagogical-content framework abbreviated TPACK², which builds on Shulman's idea of PCK³ and attempts to capture some of the intrinsic qualities of knowledge needed by teachers to integrate technology into their teaching while also addressing the complex, multiple and situational nature of teacher knowledge. At the heart of the TPACK framework is a complex interaction of three basic forms of knowledge: Content - *Content* (CK), Pedagogy - *Pedagogy* (PK) and Technology - *Technology* (TK). (Koehler et al. 2014).

Pedagogy, curriculum, school rules and climate, assessments and skills acquisition are all key factors on which 21st century skills are developed and monitored. Classroom is the first environment that leads to the culmination of these factors that lead to the development and acquisition of skills. Also, classrooms are a place where students observe a model of these skills from their teachers. Therefore, it is equally important to prepare and train teachers not only in acquiring the skills for the 21st century, but also in disseminating those skills. Teachers of the 21st century need to take into account the needs of their students and prepare them with challenges in the future. The job of a teacher is considered de-

manding and complex. To create a quality professional teaching force, it is important to have a quality teacher training programme. The development programme shall include the use of integration technology in teaching.

3. Methodology

1. Subject of research

The subject of the research is to improve the professional development of teachers through learning management systems. It is necessary to examine how familiar teachers are with digital professional development and how satisfied they are with the existing opportunities for digital professional development, and whether existing training contributes to their professional development.

2. Research objective

The aim of the research is to determine how satisfied teachers are with the current professional development through a learning management system, and to identify specific areas in which the professional development of teachers can be improved through LMS. The aim will be to identify the problems faced by teachers who are professionally trained in the digital environment, to avoid these problems and to find ways and strategies for action in future professional development that will be in line with the opinions and needs of educational workers.

3. Research Tasks

- Examine whether teachers are satisfied with the existing digital professional development opportunities
 - Examine whether existing trainings contribute to the professional development of teachers
 - Examine the possibilities of improving the professional development of teachers
 - Examine what are the challenges of online professional development that teachers encounter.
 - Examine and determine the forms of online professional development that respondents prefer.
- Thus, the aims of this research are set as:
- To examine if teachers prefer professional development in an online environment.
 - To determine if teachers need additional technical support and training to make better use of learning management systems.

- To examine if teachers need a greater choice of courses and resources covering different areas of teaching, pedagogical strategies and new technologies.

4. Research methods

To improve the professional development of teachers through learning management systems, we can use a survey to help us collect information. In this study, the method of testing, the technique of interviewing, was used. The survey consists of two parts. The first part required data on the age and length of service of the subjects. The second part of the survey examined teachers' attitudes regarding professional development in the digital and physical environment.

Also, descriptive-analytical method was used, which was applied in the data collection phase, to, assess and compare, evaluate and interpret the data obtained in the process of analysis and drawing conclusions.

4. Research results and disucssion

Table 1. Distribution of subjects by age

	Number of respondents	% of total respondents
25 - 30	11	22%
31 - 40	12	24%
41 – 50	15	30%
50 and up	12	24%
Total	50	100%

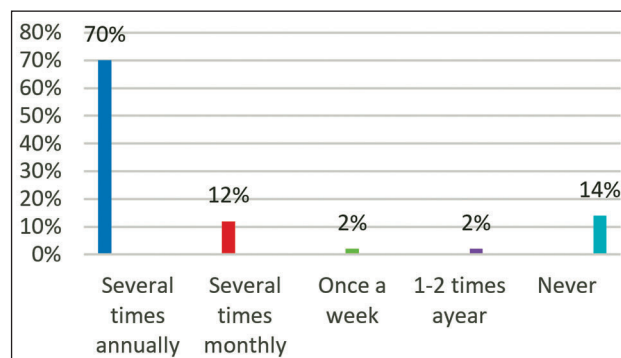
Of the 50 respondents, 11 (22%) are between 25-30 years old, 12 (24%) are between 31-40 years old, 15 (30%) are between 41-50 years old, and 12 (24%) are 50 years old and older.

Table 2. Distribution of respondents by length of service

	Number of respondents	% of total respondents
0 - 5	13	26%
6 – 10	4	8%
11 - 20	11	22%
20 and up	22	44%
Total	50	100%

Of the 50 respondents, 13 (26%) work for up to 5 years, 4 (8%) work for 6 to 10 years, 11 (22%)

work for 11 to 20 years, 22 (44%) work for 20 years and older.

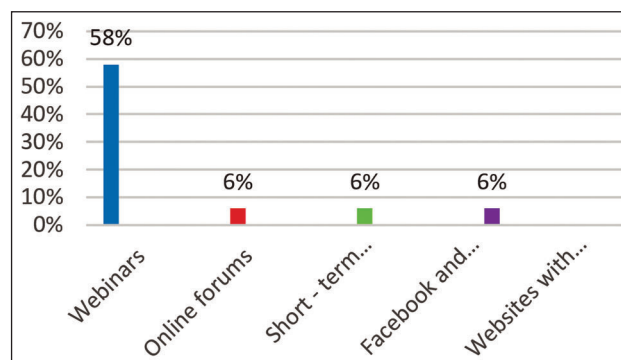


Graph 1. How often do you participate in an online training programme? (Online modules, webinars, virtual classrooms. . .)

Table 3. How often do you participate in an online training programme?

	Number of respondents	% of total respondents
Several times annually	35	70%
Several times monthly	6	12%
Once a week	1	2%
1 – 2 times a year	1	2%
Never	7	14%
Total	50	100%

When asked how often teachers participate in an online training programme, the largest number of respondents, 35 (70%) stated that they participate in online professional training several times a year, and 7 (14%) of respondents never participate in online professional training.

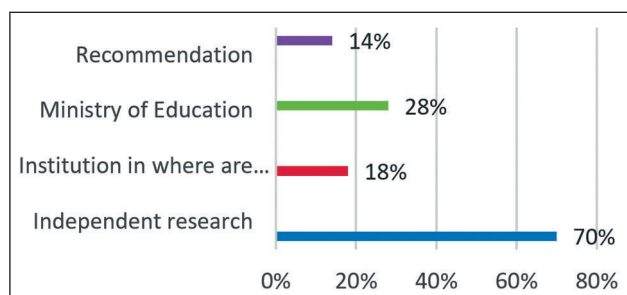


Graph 2. Which of the above online education have you most often attended?

Table 4. Which of the above online education have you most often attended?

	Number of respondents	% of total respondents
Webinars	29	58%
Online forums	3	6%
Short – time online courses	3	6%
Facebook groups and similar	3	6%
Websites with information which you can preview in time when suits you	11	22%
Total	50	100%

The largest number of respondents, 29 of them (58%) most often attend webinars as a form of online professional training, 11 respondents (22%) use websites with information that they can view at a time that suits them, while 3 respondents most often attend other forms of online education. It can be concluded from the enclosed that the largest number of teachers use webinars as a form of online professional development.



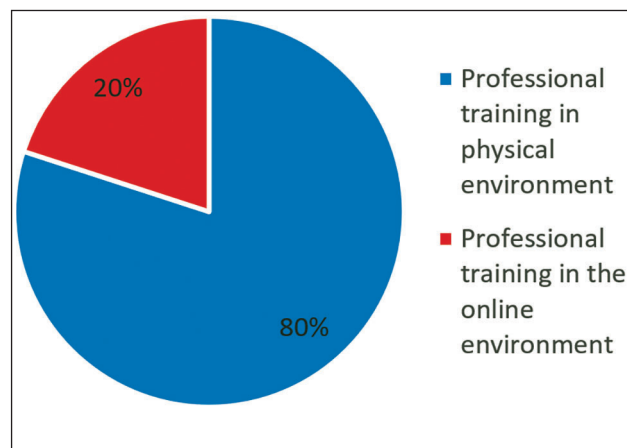
Graph 3. How did you get the information about maintenance of online professional training?

Table 5. How did you get the information about maintenance of online professional training?

	Number of respondents	% of total respondents
Independent research	35	70%
Institution in which you are employed	9	18%
Ministry of Education	14	28%
Recommendation	7	14%
Total	50	100%

When asked how teachers get information about online professional training, 35 (70%) of respon-

dents independently research online professional training, 14 (28%) learn through notifications to the Ministry of Education, 9 (18%) receive information from the institution where they are employed, and 7 (14%) of respondents find out information about certain online professional training on recommendation. Also, teachers do not have systemically organised professional training, but mostly through independent research and recommendations they learn about certain online education.

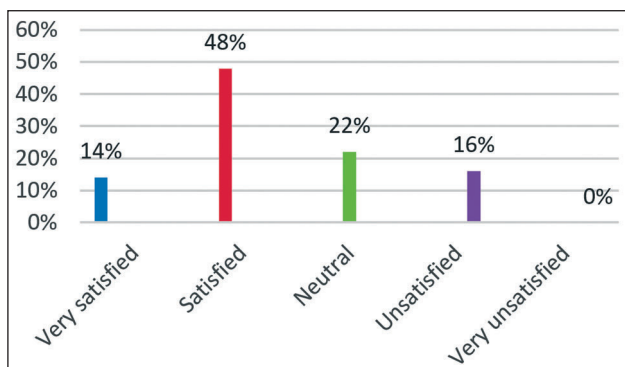


Graph 4. Which type of professional training do you prefer?

Table 6. Which type of professional training do you prefer?

	Number of respondents	% of total respondents
Professional training in a physical environment	40	80%
Professional training in the online environment	10	20%
Total	50	100%

Although a number of shortcomings in teacher training are listed, 40 (80%) of respondents prefer to choose professional training in a physical environment, while 10 (20%) prefer professional training in an online environment. From the above results, we can conclude that teachers prefer professional development in the online environment. The results show that 40 respondents, despite the shortcomings of professional training in the physical environment, still prefer to choose this type of professional training.

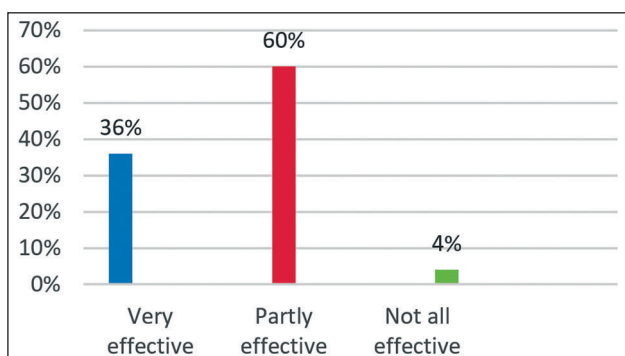


Graph 5. How satisfied are you with your professional development in a physical environment?

Table 7. How satisfied are you with your professional development in a physical environment?

	Number of respondents	% of total respondents
Very satisfied	7	14%
Satisfied	24	48%
Neutral	11	22%
Unsatisfied	8	16%
Very unsatisfied	0	0%
Total	50	100%

When asked how satisfied teachers are with professional development in a physical environment, 24 (48%) of respondents said that they are satisfied, 7 (14%) of respondents are very satisfied with professional development in a physical environment. Eleven (22%) respondents are neutral, while 8 (16%) respondents are not satisfied with professional development in a physical environment.

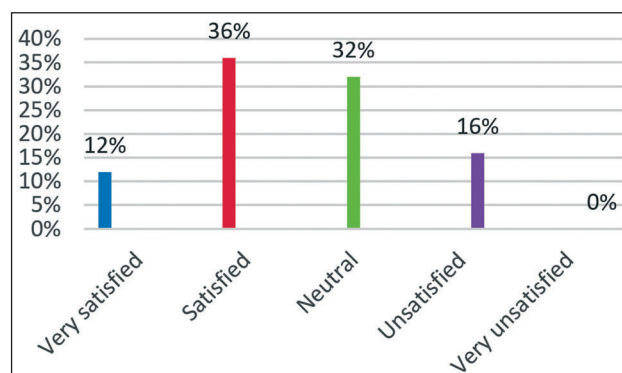


Graph 6. How effective do you think webinars, online workshops and other professional training are?

Table 8. How effective do you think webinars, online workshops and other professional training are?

	Number of respondents	% of total respondents
Very effective	18	36%
Partly effective	30	60%
Not all effective	2	4%
Total	50	100%

Most teachers think that online training is effective, 30 (60%) think that it is partially effective, 18 (36%) think that it is very effective, and 2 (4%) of respondents think that online professional training is not at all effective.

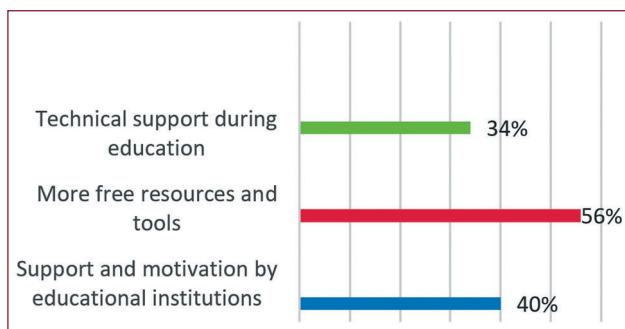


Graph 7. How satisfied are you with availability of online professional development?

Table 9. How satisfied are you with availability of online professional development?

	Number of respondents	% of total respondents
Very satisfied	6	12%
Satisfied	18	36%
Neutral	16	32%
Unsatisfied	8	16%
Very unsatisfied	2	4%
Total	50	100%

When asked how satisfied they are with the availability of online professional training, 6 (12%) are very satisfied, 18 (36%) respondents are satisfied, 16 (32%) respondents are neutral on this issue, 8 (16%) respondents are dissatisfied, and 2 (4%) respondents are very dissatisfied with the availability of this type of professional training.



Graph 8. What would encourage you to use more often online professional training?

Table 10. What would encourage you to use more often online professional training?

	Number of respondents	% of total respondents
Technical support during education	20	34%
More free resources and tools	28	56%
Support and motivation by educational institutions	17	40%
Total	50	100%

The largest number of respondents, 28 (56%) said that more free resources and tools would encourage them to use online professional training more frequently. Also, 20 (34%) of respondents believe that they need technical support during education, and 17 (34%) of respondents expect support and motivation from the educational institution.

This confirms that, more teachers need technical support during education, given that 40% of respondents think that they need this type of support to access professional training in the online environment.

The disadvantages of professional training in the physical environment cited by the respondents are as follows:

- „Large number of people, inadequate time“
- „Realisation distance, theorising“.
- „Too much talk, a little practical knowledge. . “
- „Inability to reconcile business or other previously agreed obligations with the term of training, too large a group of participants“
- “Inadequate preparation of the lecturer; disinterest of the teacher; most often the frontal form of work:“ „Time (duration, hourly rate), place (distance from the place of residence), very often

non-compliance with working hours or misunderstanding of superiors“

„Always the same topics, just new educators. It’s been going around in circles for 18 years. All education is in vain, when you do not have support in the institution where you work.“ „Lack of concrete solutions. . “

“Small halls or classrooms, but also flexibility and adjustment of other teachers.“ „Not enough. What she has, I finance myself“

“Sometimes, non-creative lecturers do not present the content in the right way. . ,

„More creative examples, which we can apply. . “

The main shortcomings of professional training in the physical environment are the inability to harmonise time and space with everyday obligations, as well as the lack of creativity by educators.

The most common challenges in online training are:

“Lack of focus, insufficient commitment of both participants and lecturers”

“Internet connection. ”

“Practical part, show, experience”

”Good concentration requires a nice and pleasant environment, calm down, focus on what we do. . . and it is not always possible to have that at home if we follow online education. . . “The only advantage we have is that we participate from our own home. . ”

“Insufficient IT literacy of participants in which we include ourselves”

“Design educations that will meet the needs and interests of a wider audience; topics must be applicable, current and significant for professional development. ” “Many monologues. . ”

“I don’t think it’s a challenge at all”

“The quality of presentations and training, but also the possibility of active participation. The biggest challenge is to animate the auditorium. ”

“Acquiring new knowledge at your own pace”

“Online professional training is quite constructive, and can provide almost the same results as in the physical environment, and as for the challenges, there can be fears of poor internet connection and the like. . ”

“Problems with internet connection and inability to discuss quality. . ”

“Be clear and fun”

“Make a decision to get involved”

The respondents' answers indicate that teachers still do not have sufficiently developed digital competences for the use of online resources, since the biggest challenge in online professional training is insufficient IT literacy. Also, one of the challenges is the inability to convey the real experience and the lack of focus during online education. All this points to the design of online education in a different way with the aim of improving the focus of participants, more accessible and interesting topics and educations in which participants will be active, not passive participants.

In order to improve and improve the professional development of teachers, respondents answered the following question. Which specific topics or areas would you like to be covered by online professional training?

"Psychological topics, educational topics. . ."

"Practical working methods"

"IT training. "

"Education for a new time, working with gifted children, how to improve the concentration of students. " *"Specific forms of work. . ."*

"Working with parents and class community, experiments in teaching, "

"Any area that is not based on the platitudes of lecturers who conceal unpreparedness"

"Areas of working with children from the autistic spectrum, but also socialisation of children coming from socially vulnerable families, and recognition of selective mutism in children. " *"Examples from practice and coping with today's conditions. "* *"Family. . ."*

"Integrated teaching, teaching based on defined learning outcomes, school of the 21st century. (education and training). "

"Education in the broadest sense (support, examples of practices. . .), media and financial literacy" *"New learning methods, examples of good practice. . ."*

"Practical training, free tools"

"Introduction to techniques and tools suitable for teaching. "

"Modern teaching methods and techniques, strengthening teacher competencies for the 21st century"

"Reading with understanding, working with children with problems of reading, writing, computing. . ."

"Evaluation, multimedia in teaching. "

"How to motivate students"

"In general, everything is interesting and welcome that is related to the teaching process, but with practical examples without a dominant theory"

"Working with children with disabilities, concrete tips and examples"

How would you improve the professional development of teachers in order to better meet your needs?

"By organising quality workshops where you can hear something new (mostly the same lecturers, other topics, nothing new teachers do not learn). "

"Lectures and concrete demonstrations of individual methods of work"

"More different options according to your own interest, bring better-known educators".

"To be specifically related to the topics and contents of the class in which I work, best in August and January. "

"Every training must have a decisive goal and outcomes as good teachers do in the teaching process. In addition, the best among the participants was the exchange of experiences. There's a lot of people in the class who've been working since '93, '94, . . . we've been listening to training and really good things. "

"To organise various educations, workshops and other activities for teachers during the month of August before the beginning of the school year"

"First to improve the status of teachers in society"

"Workshops, conversations, exchange of experiences. "

"Better interaction between lecturers and teachers".

"Any professional training with a clear goal and good preparation of the lecturer meets my needs. I'm not a fan of professional training whose only goal is "to organise something. " "

"Specific situations(- problem-solution). "

"Educate in schools"

"Practical training and free tools"

"Technical support in the institution where I work Means, we do not have a copy machine, printer, wifi, paper I buy, no matter what is needed"

"As many seminars and as much understanding as possible by the parents"

“Higher quality educators from abroad, more modern topics and active participation of all present.”

“Do not limit the time for online learning. In a physical environment: Ready (competent) realizers focused exclusively on the realisation of topics with as many concrete examples as possible. Throw out redundant activities (familiarisation and the like), which only serves to fill the training time.” “Make them easily accessible. . .”

“Adapt the contents of the same to the needs of teaching”

“More frequent education with concrete examples, experience from practice”

In order to improve and improve the professional development of teachers, respondents' answers were singled out on what is needed for professional training to meet their needs in educational work and what topics they would like to cover during professional training. It can be concluded that teachers want to modernise the way of professional development, primarily from the topics offered, the way of presentation by educators, and then the existence of greater opportunities for online learning. This confirms that teachers need a greater choice of courses and resources covering different areas of teaching, pedagogical strategies and new technologies. The need for easier access to the content of professional training is also required, which can be achieved through the use of certain learning systems. Teachers believe that the topics that are currently represented in the course of professional training contain a lack of concrete and practical examples. It also mentions the constant repetition of the same topics, which do not contribute to solving the problems that teachers face in educational work.

5. Conclusion

The aim of this research was to point out the need to improve and modernise professional training for educational workers through learning management systems. The results showed that a larger number of teachers believe that insufficient creativity, lack of practical and concrete solutions reduce the efficiency of professional development. It is also an underdeveloped computer

Literacy prevents teachers from using online forms of education more often. The results show

that teachers, through independent research, come to information about the organisation of certain professional training, which indicates the need for better promotion of professional training by the Ministry, as well as educational institutions. It is necessary to improve the ways of professional training to make teachers more positively orientated to online education, since in this way they can exchange experiences and practices with educational workers from other countries.

The conducted research is of a smaller scale, with a smaller sample of respondents. The obtained results indicate that teachers need more technical support when using online education, but also the need for more creative, concrete topics, which will facilitate the educational work of teachers. A concrete training plan for teachers in line with current educational reforms would facilitate teacher training. Designing concrete online virtual classrooms that will be accessible and that will allow teachers to have access to the materials even after training. Results of the research obtained,

They point out that it is necessary to work on further training of teachers, especially in the development of digital competencies, all with the aim of improving the educational process and successful implementation of educational reform. In order for this type of professional development to be realised in practice, teachers should be provided with the opportunity to master the ways of online education, explain the use of the learning management system and provide an adequate incentive.

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