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PROFESSIONAL DEVELOPMENT OF PRESCHOOL TEACHERS IN THE FUNCTION OF IMPLEMENTATION OF STEAM APPROACH[1]

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Abstract: The professional development of preschool teachers and readiness for innovative action is challenging for educational policy-makers and teachers. The starting basis of the work is the analysis of normative acts, legal regulations, and guidelines that document the importance, expediency, and effectiveness of teachers' professional development. The paper discusses the relevant scientific sources, which shed light on the basics of the STEAM approach. The challenges and perspectives faced by preschool teachers when implementing the STEAM approach are determined through the analysis of research findings, as well as the importance of professional development for the improvement of knowledge, skills, and values necessary for the implementation of the STEAM approach. The literature analysis identifies the challenges that can be a dysfunctional factor in the STEAM implementation in educational practices and which primarily originate during the professional development of preschool teachers. By reviewing relevant sources, the specific implications of using the STEAM approach are determined.

Keywords: professional development, STEAM approach, preschool teacher, normative regulation

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INTRODUCTION

Through a critical review of the literature, as the goal of the paper, we highlight the analysis of the concept of the STEAM approach in preschool education by focusing on the benefits it provides and the challenges that arise, putting in mutual connection the peculiarity of the importance of the professional development of teachers for the effective implementation of the STEAM approach in direct work with children.

Due to the large, continuous transformations of educational goals, outcomes, and the need to form a new type of teacher with personal and professional competencies for lifelong learning, the Ministry of Education, as the initiator of reforms in education, approaches the process of teachers' professional development with great care. Within legal regulations, the Ministry of Education has regulated this area through laws and regulations. From the perspective of the best interest of a child and the improvement of the educational process, as well as the affirmation of work efficiency, it is vital to provide comprehensive support to teachers. A competent teacher is a part of the paradigm that has been set. To ensure the thorough and complete professional development of teachers, it is necessary to satisfy their professional needs.

Early childhood, as the period of the most turbulent development and the period of creating the foundation for the further development of the individual, requires the creation of a stimulating environment within which the child will develop his full potential through experiential situations. As a response to the presence of ongoing global changes, and in an effort to create professionals who will be able to actively and effectively operate in the field of the labor market using the acquired knowledge, the trend of STEAM education is gaining popularity in many countries. The teachers' need for professional development in the function of realizing STEAM activities has been proven by a significant amount of research (Jamil, et al. 2017).

NORMATIVE REGULATION OF THE PROFESSIONAL DEVELOPMENT OF PRESCHOOL TEACHERS

Professional development of teachers is a right, but also an obligation of teachers. The changes that are taking place in all areas of society have not bypassed preschool education. Due to the need to harmonize with the demands of society, that is, the needs of children, it is necessary that both the normative regulation and its application follow the demands of children, that is, contribute to the achievement of high-quality preschool education and enable and oblige teachers to work on their professional development. The competences of

teachers as an important segment of achieving the quality of services in early childhood are acquired both during basic education and through training and lifelong learning. These three segments of teacher competence acquisition are interrelated. Normative acts, study programs, and continuing professional development programs are aligned with the needs of children, that is, the need to provide quality services for children of preschool age.

In the Republic of Serbia, regarding the required qualifications of employees in preschool institutions, there is a model where the qualifications of employees differ and where children aged six months to three years work with nurses who have completed a four-year school, while children aged two years work with teachers who have completed primary or master's vocational studies or academic studies, as well as teachers with higher education who completed their studies according to the previously valid plan and program for teacher education (Law on Preschool Education, 2010, Article 39). In Europe, there are two models regarding the qualifications of employees in preschool institutions. In the first model, which also exists in our country, the qualifications of employees who are in charge of the youngest children and teachers who work with children older than 3 years are different. This model is also represented in Belgium, France, Italy, Luxembourg, Portugal, the Netherlands, Greece, and Ireland. In the second model, there is a unified system regarding the requirements for the necessary qualifications (Denmark, Finland, Sweden, New Zealand, Spain, England, and Scotland). In England and Scotland there used to be a distinction in terms of the required qualifications, but the system has now been equalized. According to the official position of the European Union, it is considered unjustified that employees with lower qualifications, that is completed four-year high school, work with children at a younger age (up to 3 years) (Urban, et al., 2011).

According to the Law on Preschool Education and Training (2010, Article 38), it is the teacher's task "to ensure respect for the principles and the realization of the goals of preschool education with his competencies." It is the obligation and right of teachers to continuously review and develop competencies through various types of professional development (Regulation on Continuous Professional Development and Advancement in the Professions of Teachers, Preschool Teachers, and Professional Associates, 2017, Article 2). It is for this reason that we are aware of the fact that the knowledge acquired in basic studies is not enough to respond to the demands and changes that happen daily and quickly. The professional development of teachers begins with the introduction of trainees into the work of teachers, in order to acquire knowledge and develop skills for independent work. (Guide for the Introduction of Preschool Teachers to their Position in Preschool Institutions, 2010). After completing the internship and taking the license exam, the teacher's professional

development continues through various trainings, as well as through "constant review and reflection on conceptual settings and personal beliefs and practices, by participating in the development of reflective practice in their kindergarten through cooperation with professional associates and teachers" (Fundamentals of Preschool Education Program, 2018, 34). The professional development of teachers as an essential prerequisite for achieving high-quality preschool education implies the acquisition and development of competencies necessary for: direct work with children, possession, and improvement of knowledge about cooperation and exchange of experiences with colleagues, work with family and improvement of professional practice (Regulation on Standards of Teachers' Competences and their Professional Development, 2018).

Activities aimed at training preschool teachers to deal with their professional development are also regulated by the Rulebook on Work Permits for Teachers, Preschool teachers, and Professional Associates, according to which the teacher, after being introduced to the work of a trainee teacher by the assigned mentor, takes an exam for a license to work as a teacher. The Rulebook regulates the knowledge, skills, and abilities of a teacher who has undergone the process of introduction to the work of a teacher and which refers to the possibility of working on his professional development. First of all, after passing the license exam, the teacher must: know the importance of continuous professional development; be familiar with different forms and methods of professional development; understand the ways and techniques of planning professional development; know the structure of professional bodies at the institution level; know the elements for planning one's own professional development; participate in various forms of professional development; follow the development of modern literature and educational technology (Regulations on the Permit for the Work of Teachers, Preschool Teachers, and Professional Associates, 9/22).

The adopted regulations regarding the professional development of preschool teachers will not achieve their purpose if they are not accompanied by concrete political measures in the form of providing teachers with the necessary conditions for work, both spatial and material, and the conditions related to the recognition of the need for sufficient time to analyze and document practice. "The quality of the workforce cannot be reduced to the sum of competencies. […] In fact, the quality of the workforce is determined by the interaction between competent individuals in what we call a competence system" (Urban, et al., 2011: 27). Numerous countries perceive the implementation of the STEAM approach as the main attribute of future economic, political and educational development, although this approach still cannot offer all the answers to certain educational problems (Razi & Zhou, 2022). Every successful transformation of educational systems must have effective professional development of teachers as a basic resource (Trilling & Fadel, 2009).

THE STEAM APPROACH IN PRESCHOOL EDUCATION

The concepts that promote and encourage the processes of curiosity, creativity, collaboration, and critical thinking should be represented in early childhood because these processes are innate in children (Chesloff, 2013). It is shown that the above-mentioned skills, which are used to get out of the template frameworks of action, are of vital importance for the development of an individual's future career. International research concludes that it is necessary to create a pedagogical environment and new approaches to the educational process in which creativity, critical thinking, imagination, innovation, flexibility, and interaction will be encouraged (Harris & Bruin, 2017). In research, we also come across the sources that prove that an interdisciplinary approach to work that includes visual arts, mathematics, and literacy contributes to cognitive development and the development of meaningful thinking (Cunnington, et al., 2014).

The STEAM approach has its origins in the STEM approach that was launched in the 1990s in the United States of America. The addition of art to the STEM approach aimed at increasing children's motivation, sense of interest, and attraction to participate in STEAM activities, and increased socio-emotional development. The STEAM approach in its name is an acronym that includes science, technology, engineering, art, and mathematics (Dua, 2022). The importance of interdisciplinary and multidisciplinary cooperation is reflected in the fact that it represents a dynamic influence on the process of children's adaptation to the world around them (Yakman, 2008). In support of the implementation of the STEAM approach in educational work, there are opinions that the most important skills needed in the 21st century are critical thinking skills, problem-solving abilities, and creativity (Trilling & Fadel, 2009). Adding art to the STEM approach provides a key component that contributes to the development of creativity and innovation (Beaman & Sears, 2013).

The STEAM approach to learning represents an experiential form of learning and it contributes to the response of educational institutions to contemporary development trends and the need for the formation of an individual who will have the skills needed to effectively build his or her future, which are primarily the skills of creativity and innovation, collaboration, communication, critical thinking, and problem-solving (Dua, 2022).

Highly trained teachers, the teachers who are builders of their practices, are the key in the implementation of the STEAM approach. In the sources, we can find results that confirm that using this approach contributes to improving children's achievements (Brouillette & Graham, 2016). The goal of this approach is to create a transdisciplinary learning environment that allows children to connect their activities with the real world around them and acquire

skills to demonstrate ways to solve real-world problems (Liao, 2016). With this particular approach to learning, preschool children become more self-confident, more active, and able to take initiative based on the knowledge and skills they acquire (Wahyuningsih, et al., 2020).

The positive contribution of STEAM activities to the development of creativity in early-age children was determined through the analysis and existence of flexible thinking, innovative thinking, thinking about details, and fluid thinking (Atikah & Biru, 2024).

Through their work, preschool teachers have the task of preparing children to face real-life situations and actively act in them. The STEAM concept contributes to these outcomes because skills such as observation, research, critical thinking, which are acquired within this approach, are transferable, and they can be used in different spheres of life (Spyropoulou, et al., 2020).

PROFESSIONAL DEVELOPMENT OF PRESCHOOL TEACHERS AND THE STEAM APPROACH TO PRESCHOOL EDUCATION

Professional development is a "continuous process that begins with the choice of profession, through basic education (faculty and higher school for teachers), introduction of teachers to work (traineeship), as well as constant development, professional development, and further education during work" (Stamatović, 2006: 475). In the Rulebook on Continuous Professional Development and Advancement in the Professions of Teachers, Preschool Teachers, and Professional Associates, professional development is defined as "a complex process that implies the constant development of the competencies of teachers, preschool teachers and professional associates in order to perform their work better and improve the development of children and students that is the level of their achievements" (The Rulebook on Continuous Professional Development and Advancement in the Professions of Teachers, Preschool Teachers, and Professional Associates). The same rulebook points out that an integral and mandatory part of professional development is vocational training, which implies the acquisition of new and improvement of existing competencies important for the improvement of education, professional work, and child care.

The three most important effects of the teacher's professional development (Mizell, 2010) refer to the fact that: the teacher acquires new knowledge and skills, improves the management of educational work, and the most significant effect is the greater achievement of children during the educational process.

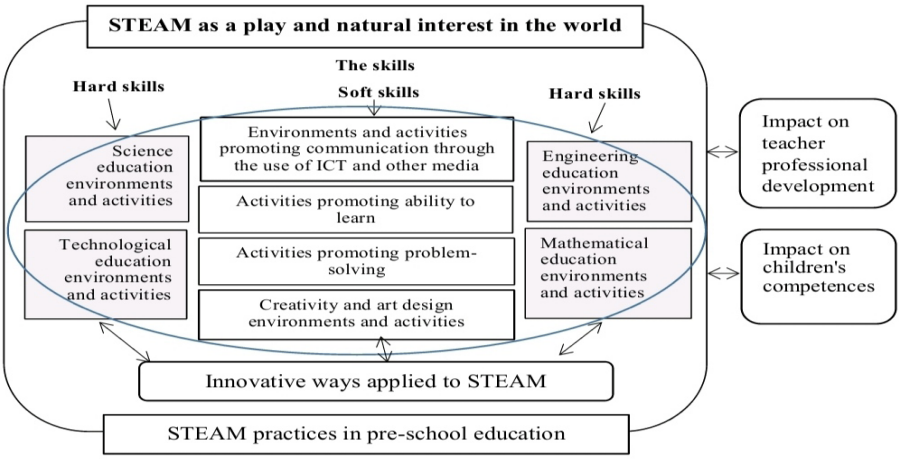
Teachers, in the process of their professional development, represent adult students. The importance of the inextricable connection between the professional development of teachers and the learning of adults is recognized in the Guide for Professional Development in Preschool Institutions through Horizontal Learning, which highlights the principles whose observance conditions the quality of learning of teachers during professional development. According to the stated principles, teachers' learning is more successful: when during that process they notice the problem and the purposefulness of learning; when teachers can participate in shaping opportunities for learning and creating conditions for learning, when within the collective they feel that they are competent and when their autonomy is respected while fostering a sense of trust, respect and appreciation, and when success is achieved in that learning process (Guide for Professional Training in a Preschool Institution through Horizontal Learning, 2022).

The concept of STEAM education is a relatively new trend and has not been incorporated to a significant extent in the initial education programs of teachers in Serbia. Also, analyzing the offer of formal training for the professional development of teachers, we do not find a sufficient number of potential training in which teachers can be trained for the needs of the implementation of the STEAM approach in the educational process. Bearing in mind the efficiency of the STEAM approach and the above data, it can be expected that the need for the training of teachers in this area will be actualized.

In current research (De Jarnette, 2018) of preschool practice, we come across sources that show that teachers' engagement in professional development increases their self-efficacy, contributes to a sense of comfort, and increases the base of strategies and the ability to incorporate STEAM activities in their immediate work with children. However, the implementation of the STEAM approach, despite positive information on the outcomes of professional development, was not at a high level, which indicates that teachers had reservations regarding the level of their capacity to implement STEAM activities, requiring additional support in preparing activities. Here, there is a gap between the effect of professional development and the support that is necessary to put what has been learned into practice. An important fact is that children in STEAM activities showed a high degree of enthusiasm, engagement, experimentation, and communication.

Through their research, some authors indicate that preschool teachers have less developed skills in terms of mathematical, engineering, and technical education, as well as that the professional development of teachers within the STEAM approach to learning leads to the self-directed improvement of professional competencies of teachers and is an essential factor for the development of

the implementation of STEAM approach by which they are improved (Monkeviciene, et al., 2020). The same authors provide a graphic representation of the components of STEAM practices and their impact on the development of children's competencies and professional development, pic. 1.



Source: (Monkeviciene, et al., 2020, 11).

Picture 1. STEAM as a play and natural interest in the world

Bearing in mind the multidisciplinarity of the STEAM approach, the child's age should be taken into account and children should not be overloaded with different contents at the same time.

Teachers' views on the effectiveness of the STEAM approach show that they can be different depending on their age, work experience, and professional qualifications they possess (Jamil, et al., 2017). The research worth mentioning (Jamil, et al., 2017) is also the one examining the attitudes of 60 preschool teachers after professional development in the field of the STEAM approach, which indicates that teachers view the STEAM approach as a separate content to be realized and not as a part that can be integrated into the existing educational practice, and the implementation of the STEAM approach has a positive effect on the motivation of children and the development of their motor skills, creating positive excitement and satisfaction for them while performing these activities. The research that examined the impact of the STEAM approach is not fully focused on the learning outcomes of children, although it is determined that it contributes to the development of creativity, solving new problems, and developing new perspectives, the results of the research on the outcomes of children and to what extent those outcomes have been improved which may

lead to doubts regarding the implementation of STEAM programs (Perignat & Katz-Buonincontro, 2018).

When implementing the STEAM approach, teachers state the difficulties they faced: it is debatable how capable children can be of STEAM tasks and safety issues, and difficulties when implementing the STEAM approach in working with children with special needs. Furthermore, the challenge with the implementation of the STEAM approach is the lack of time for planning as well as the material aspect, that is, difficulties in providing materials (Jamil, et al., 2017).

A surprising fact is that less experienced and younger teachers had beliefs that do not contribute to the effectiveness of using the STEAM approach and that this data is the result of professional training attended by older teachers (Jamil, et al., 2017).

We can conclude that for the STEAM approach, as part of the innovative concepts, teachers are faced with the requirement for continuous professional development, bearing in mind that it is an interdisciplinary and multidisciplinary approach. The fulfillment of such a requirement leads to the empowerment of the teacher, who must be sufficiently motivated to reflexively review their practice, and develop cooperation and learning.

CONCLUSION

Although we can find elements of the STEAM approach in integrated programs of preschool education, it is up to the teachers to identify, combine, and use them, putting children in a position to learn based on research activities and meaningful experiences. The lack of sufficient opportunities for acquiring competencies for STEAM implementation in educational work is a signal and a space where the process of professional development of teachers could be improved.

The specific implications of using the STEAM approach in preschool are multidirectional. First of all, the focus is on the possibility of influencing the intellectual sphere of children's development, on a holistic approach to children' development, contributing to the development of creativity, critical thinking, self-confidence, initiative, as well as preparation for successful dealing with future everyday life situations. For such specificities to be realized, successfully implemented, and supported, the role of the teacher is transformed into the role of a facilitator who will upgrade the competencies necessary for the successful implementation of the STEAM approach in direct work with children through additional training.

The review of the mentioned literature found that the STEAM approach contributes to the development of children's skills. The effective implementation of this approach is conditioned by the professional development of preschool teachers through the acquisition of competencies through formal, informal, and accidental forms of training. Challenges that teachers may face when implementing the STEAM approach are related to the existence of adequate space and environment, lack of materials and resources, lack of sufficient time for planning and insufficient expertise of teachers in the implementation of the STEAM approach. In addition to identified challenges in the implementation of STEAM activities in a preschool institution, the realization of a professional development program and support for the implementation of acquired knowledge and skills from the implementation of the STEAM curriculum is a necessity for the formation of a stimulating environment for children within the STEAM approach.

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