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**САМОРЕАЛИЗАЦИЯ ЛИЧНОСТИ  
В ЭПОХУ ЦИФРОВИЗАЦИИ:  
ГЛОБАЛЬНЫЕ ВЫЗОВЫ  
И ВОЗМОЖНОСТИ**

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Международной научно-практической конференции**

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В сборнике представлены материалы Международной научно-практической конференции «Самореализация личности в эпоху цифровизации: глобальные вызовы и возможности». Исследования посвящены современным проблемам самореализации личности в цифровом пространстве. Рассматриваются вопросы самореализации в системе образования и иных видах профессиональной деятельности. Затронуты отдельные вопросы самореализации в трудных жизненных ситуациях, экстремальных видах спорта, в силовых структурах и др. Опубликованы работы авторов из разных регионов ближнего и дальнего зарубежья (Беларусь, Болгария, Босния и Герцеговина, Сербия, Германия, Казахстан, Таджикистан, Приднестровье и т.д.), а также многочисленных регионов России (Благовещенск, Кубань, Новосибирск, Кемерово, Томск, Санкт-Петербург, Тольятти, Татарстан и т.д.).

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### **УВЕРЕННОСТЬ В СЕБЕ ПРИ ИЗУЧЕНИИ МАТЕМАТИКИ: СИНТЕЗ ИССЛЕДОВАНИЙ TIMSS В РЕСПУБЛИКЕ СЕРБИЯ**

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**Аннотация.** В данной статье обсуждается значимость уверенности в себе учащихся при изучении математики на основе анализа данных, полученных в результате исследований TIMSS в 2015 и 2019 годах в Сербии. Результаты исследования показали, что уверенность в себе является важнейшим предиктором успеваемости учащихся по математике, из чего следует, что на уроках математики особое внимание должно уделяться развитию математических компетенций, самостоятельности и активному отношению учащихся к обучению.

**Ключевые слова:** уверенность в себе, мотивация, успеваемость, TIMSS в Сербии.

## SELF-CONFIDENCE IN LEARNING MATHEMATICS: TIMSS IN SERBIA RESEARCH SYNTHESIS<sup>4</sup>

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**Abstract.** The paper examines the importance of self-confidence in learning mathematics based on analyses of data obtained in TIMSS 2015 and 2019 in Serbia. It is confirmed that self-confidence is the main predictor of students' mathematical achievement, suggesting that teaching should focus on developing mathematical competencies and encouraging student autonomy and active engagement in the learning process.

**Keywords:** self-confidence, motivation, achievement, TIMSS in Serbia.

Self-confidence is a part of the process of self-realization and represents a psychological and social phenomenon that becomes developmentally stable while remaining open to variation in different circumstances. A strong belief in one's own efficacy in the regulation of motivation and learning activities provides the energy necessary for long-term engagement and consequent achievement. Higher self-efficacy leads to setting higher personal goals and a more tenacious approach to their realization, as well as perseverance in the face of difficulties [1; 8].

In the school teaching context, the focus is on the perception of one's own ability to perform certain activities. As students engage in learning and decision-making processes, they receive specific feedback on their abilities and thus gain confidence in these abilities. They practice their self-evaluation skills throughout development. In the early grades, most students are characterized

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by unrealistic self-confidence. They feel efficient in performing difficult tasks and even when they receive negative feedback, their sense of self-confidence does not necessarily decrease [8].

Students who believe that they have lower mathematical abilities tend to be less motivated than students who believe that these abilities can be developed through increased learning efforts [8]. In the first grade, students who like mathematics tend to be highly confident in their abilities. From the third grade onwards, students with lower achievement tend to develop an aversion to the subject. However, in higher grades, students mostly believe that anyone can learn mathematics and that greater efforts significantly contribute to higher achievement.

In terms of the contribution of motivation to mathematical achievement, studies have particularly highlighted the importance of intrinsic motivation, which is associated with the need for autonomy and developing one's own abilities. In itself, self-confidence does not guarantee high achievement, it is necessary for students to experience personal meaning in mastering the content [3].

This paper summarizes the analyses of data obtained in TIMSS 2015 and 2019 studies conducted on a representative sample comprising over 4.000 fourth-grade elementary school students from Serbia. The cited research established links between student self-confidence and intrinsic motivation for learning mathematics, students' perceptions of teachers' behavior, students' absenteeism, and their achievement on the TIMSS mathematics test. The most of the data were obtained via student questionnaires, while information on the using of different teaching methods was obtained via teacher questionnaires (N=192).

Analyses showed that 80% of students from Serbia reported high levels of self-confidence in learning mathematics [5]. Most students assessed learning lessons quickly and having no trouble solving difficult mathematical problems. The results revealed no differences in students' levels of self-confidence in learning mathematics and natural sciences. This finding indicates that the

teaching approach has a greater influence on student self-confidence compared to subject content characteristics. Higher levels of self-confidence were accompanied by higher motivation for learning mathematics. The level of self-confidence showed a weak correlation with students' perceptions of teachers' behavior in class. Students in the early grades were not critical in their perception of class realization.

According to teacher reports [7], mathematics was mostly taught using traditional methods. Teachers played the dominant role and students were rarely actively engaged in the learning process. In more than a half of classes, most teachers expected students to listen while they explained new content or ways of solving problems. A minority of teachers organized students to work in groups, do written exams or participate in a quiz.

In the period between 2011 and 2015, there was an increase in the number of students who reported high levels of self-confidence in learning mathematics and whose achievement was also high [4]. This was interpreted as a result of previous positive experiences and high achievement in mathematics. Self-confidence was the main predictor of mathematical achievement and mediated the link between interest in subject content and achievement. In the early grades, self-confidence was a more reliable construct for predicting mathematical achievement compared to intrinsic motivation [9]. Regular class attendance contributed to self-confidence and consequently helped students improve their mathematical achievement through a experience of success.

In the analysis of data on student self-confidence and intrinsic motivation for learning mathematics, three motivation profiles emerged [6]: the smallest number of students reported exceptionally high levels of self-confidence and intrinsic motivation, while two groups of approximately same size are characterized by high and moderate/low values for both variables. Student motivation profiles were stable during the period between 2015 and 2019. Students who reported exceptionally high levels of

self-confidence in learning mathematics and exceptionally high intrinsic motivation had the highest achievement on mathematical knowledge tests in both 2015 and 2019. The tests contained problem-solving tasks, most of which required the cognitive skills of application and reasoning. It was concluded that these high-achieving students applied conceptual understanding to task solving and that their knowledge was qualitatively superior to that of other students.

The results of the studies discussed here suggest that teaching should focus on developing students' mathematical competencies in order to encourage them to gain confidence in their own abilities. Instead of focusing on getting students interested in mathematics, teachers should help students improve their mathematical competencies. In the early grades, teachers should encourage situational interest, but the main goal should be the development of intrinsic motivation as a result of higher competency.

Teachers should encourage positive self-evaluation in students as well as the belief that subject content can be mastered. Students who believe that success is the result of the effort invested but not innate abilities, tend to evaluate themselves positively. However, even if students believe that they are successful, they may not complete their school tasks if they do not see them as meaningful, important, and valuable.

The development of student self-confidence can be encouraged setting specific, short-term goals that are challenging but attainable as well as by providing feedback on the results along with rewards that correspond to the results [8]. Feedback on progress reinforces student self-confidence and helps maintain student motivation. At different stages of learning, motivational feedback relates to efforts invested in specific situations and abilities related to specific content or activities. Perceived progress in learning bust self-confidence and motivates students to keep improving their performance. It is also considered that the achieving adaptive competence in mathematics is enabled by

development of system of cognitive, affective, and motivational components, such as organized and flexible domain-specific knowledge, heuristic methods of problem analysis and transformation, metacognitive knowledge and self-regulatory skills, positive attitudes towards mathematics, epistemic beliefs about mathematics, and motivational beliefs [2].

Encouraging student autonomy and active engagement in the learning process help improve student motivation for learning mathematics. Student cooperation is more stimulating than competition, since social comparison negatively affects self-confidence in students who perceive themselves as inferior compared to their peers.

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## КАК ПАНДЕМИЯ ПОВЛИЯЛА НА МОЛОДЕЖЬ

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**Аннотация.** В данной статье представлен обзор исследований о вызовах, с которыми столкнулась молодежь в процессе обучения и в сфере жизненных планов в период первой волны пандемии, вызванной коронавирусом заболеванием Covid-19. Проанализированные исследования указывают на специфическое влияние пандемии на молодежь разного возраста. В данной связи сделан вывод, что будущие исследования должны ориентироваться на определенные возрастные группы.

**Ключевые слова:** Пандемия, Covid-19, молодежь, образование, перемены, жизненные планы.

## HOW THE PANDEMIC AFFECT YOUNG PEOPLE

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**Abstract.** The paper presents an overview of research on the challenges faced by young people in the process of education and in the domain of their life plans during the first wave of the Covid-19 pandemic. The analyzed studies indicated the specific effects of

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