

Research Article

Determinants of active learning from the perspective of students and teachers in Croatia

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Although active learning is deemed essential in education, research has shown that its implementation in teaching practice is limited, while its potential benefits are not used to their maximum. Therefore, this paper aims to examine the determinants of active learning in contemporary teaching from the perspective of students and teachers in Croatia. The intention is to gain an insight into the application and understanding of active learning in contemporary education. The study was conducted using a questionnaire on a sample of 1231 participants (951 students and 280 teachers) in Croatia. The findings revealed significant differences between students and teachers in their assessment of active learning determinants, with students giving a less positive evaluation of their prevalence compared to teachers. The determinants of active learning are more prevalent in primary schools, which suggest there is a need for continuous development of active learning practices across all subjects and areas. This is particularly true for high schools, where students are developmentally more prepared for deep-level active learning. Professional development of teachers in the area of active learning has been identified as a critical factor in encouraging and improving these practices. However, the findings also point to certain challenges related to the organization, availability, and continuity of professional development opportunities in this area. The study revealed that active learning is a complex construct which requires substantial changes in educational practices. The most important determinants for successful implementation of active learning have been identified, highlighting the integration of its theoretical and practical elements. Such an integrated approach represents the most effective path to achieving successful active learning practices.

Keywords: Active learning; Contemporary teaching; Student; Teacher

Article History: Submitted 24 January 2025; Revised 20 May 2025; Published online 30 June 2025

1. Introduction

The contemporary education process is characterized by numerous challenges arising from constant social changes and the uncertainty of the labor market. People are expected to address these challenges successfully and adapt to changing life circumstances. In this context, active learning is a necessary component of contemporary teaching, being a basis of individual and social development, as well as lifelong learning. Special emphasis is placed on flexibility and openness to change, promoting innovation and creativity, and developing competencies that help us adapt to new and unpredictable situations. For a long time, education experts have deemed it necessary to incorporate active learning in the teaching process and the broader school environment (Simons,

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How to cite: Žižanović, S. (2025). Determinants of active learning from the perspective of students and teachers in Croatia. *Journal of Pedagogical Research*, 9(3), 291-311. <https://doi.org/10.33902/JPR.202533518>

1997). This need has become even more evident with the rapid advancement of technology and, more recently, growing integration of artificial intelligence into the education sector. With that in mind, Audrin and Audrin (2022) emphasize the need for deep learning, critical evaluation of information, and research competencies has become increasingly important. Such skills can only be developed through active student engagement in the learning process. The theoretical foundation of active learning lies in constructivism and social constructivism, while its practical application is reflected in diverse teaching methods that make students actively involved in the learning process, both on an individual and social level (Drew & Mackie, 2011).

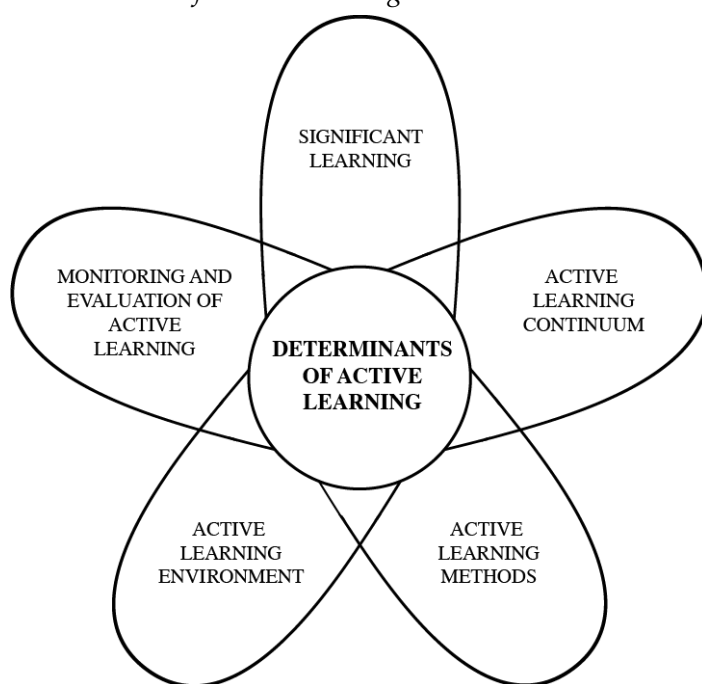
Taking this into account, understanding the determinants of active learning is crucial if it is to be integrated into practice properly.

1.1. Determinants of Active Learning

Active learning is examined thoroughly in this paper based on its key determinants. In the context of Croatian education, the following fundamental determinants were identified: significant learning, active learning continuums, active learning environment, active learning methods, and monitoring and evaluation of active learning. To ensure their effectiveness, it is necessary to address the barriers that may arise during their implementation in practice. The study of these determinants is particularly relevant in Croatia, as the Croatian education system is undergoing a curricular reform based on a student-centered approach, the organization of teaching through active learning methods, the integration of classroom learning with real-life contexts, and the development of twenty-first-century competencies and lifelong learning skills. Active learning is highlighted as a key pedagogical approach in contemporary teaching (Ministry of Science and Education, 2017a, 2017b).

Figure 1

Determinants of Active Learning



Significant learning involves the student's personal engagement in the learning process, which is reflected in their cognitive and emotional involvement during the learning event. At its core, significant learning emphasizes the meaning embedded in the student's experience (Rogers, 1969).

Students evaluate their learning based on personal meaning, determining whether it satisfies their needs and aligns with what they want to know. This type of learning results in changes in students' behavior and attitudes. Active learning emphasizes the importance of students choosing their goals and learning outcomes from a broad range of possibilities, acting on them, and

assuming responsibility for the results. Teachers play a vital role in supporting students in their choices and ensuring access to varied resources. The implementation of the comprehensive curricular reform in Croatia highlights the need for a shift toward deep learning as a response to the traditional approach that emphasized rote learning. Baranović (2015) views deep learning as a way to overcome the challenges of transitioning to a competency-based approach to education, while Biggs and Tang (2011) frame deep learning as a response to the limitations of traditional educational models, emphasizing its focus on critical thinking, conceptual understanding, and the ability to apply knowledge in new contexts.

Active learning continuums provide a conceptual and visual framework for designing instruction that maximizes student engagement in the learning process. Bonwell and Sutherland (1996) developed this framework to enhance student engagement and to assist teachers in selecting teaching methods based on active learning. An active learning continuum relates active learning to traditional, "passive" learning, spanning from simple tasks at one end to complex tasks at the other. After deciding to incorporate active learning methods into their teaching, teachers must identify where these activities fall on the continuum. The framework includes four continuums to measure variables related to selecting appropriate activities: task complexity, course objectives, classroom interaction, and levels of student experience.

Considering the competency-based approach to teaching, it is extremely important to complement the course objectives continuum by learning outcomes. The value of the active learning continuum, as one of its key determinants, lies in guiding teachers toward a better understanding of how to achieve effective active learning with their students. Considering the significant differences in the practice of implementing active learning in Croatia (Jurčić, 2012; Peko & Varga, 2014), acknowledging these continuums may contribute to a better understanding of active learning and help identify specific aspects that need to be improved in order to foster deeper student engagement.

Active learning methods contribute to the holistic development of students by ensuring their cognitive, emotional, and psychomotor engagement in the learning process. These methods are built on constructivist principles, which emphasize independent exploration, structuring and restructuring of knowledge, problem-solving, critical thinking, and evaluation (Niemi, 2002). Active learning methods vary in their complexity and, likewise, the terminology related to them is both diverse and complex. The most commonly discussed methods include problem-based learning, inquiry-based learning, discovery learning, project-based learning, experiential learning, integrative learning, case studies, peer teaching, simulations, and creative methods (Meyers & Jones, 1993; Michael, 2006; Terhart, 2001).

While any teaching method can motivate students, none of them guarantee active learning on their own, which is why they should be considered on an active learning continuum. Each method can be implemented in many ways, according to the students' stage of development, needs, and interests. By combining teaching methods, their effectiveness increases, leading to the optimal development of students. The most notable features of active learning methods include encouraging creativity, innovation, and significant learning among students. The use of active learning methods is particularly important for improving the teaching process within the Croatian educational context, as it encompasses the practical dimension of active learning and allows an individualized approach to students by addressing their needs and interests – an aspect underlined as one of the core goals of the national curriculum (Fuchs et al., 2011).

The learning environment is another important determinant of active learning. It can either promote effective learning or, if overlooked, become a barrier to students' active engagement. An active learning environment involves the classroom being an engaging space for student learning and the classroom climate, encompassing social and emotional relationships that influence active learning. In this environment, students set their own goals, select activities, participate in planning their learning, and are encouraged to reflect on and evaluate learning outcomes. Grabinger and Dunlap (1995) proposed the concept of Rich Environments for Active Learning [REALs]. In

accordance with constructivist learning principles, REALs enhance learning and inquiry in authentic contexts, support the development of student responsibility, initiative, decision-making and intentional learning, and promote collaboration between students and teachers. REALs embrace a holistic and interdisciplinary approach to education, emphasizing the social and emotional aspects of learning.

The four key elements of an active learning environment are “clarifying course goals and content, creating a positive classroom climate, managing the learning space effectively, and learning more about students” (Meyers & Jones, 1993, p. 33). The layout of the classroom is important for active learning, as it reflects the patterns of interaction expected from students. Ideally, a classroom that fosters active learning is spacious enough to accommodate students comfortably and is also equipped with movable desks or chairs with wheels. Such features allow for flexible arrangements, such as the U-shape, circle, or small groups. This determinant is particularly relevant for Croatian education due to significant disparities in school infrastructure, uneven access to technical equipment, and differences in class sizes between urban and rural areas. As Croatian schools are currently undergoing a technological upgrade process, these determinants need to be studied to gain a better understanding of how classroom space and technological conditions affect students’ active learning. Special attention should be devoted to the flexibility of the learning environment and the availability of educational technologies.

Monitoring and evaluation of active learning is an important determinant for enhancing the learning process, identifying its benefits, and addressing barriers to active learning. Emphasis should be on the learning process, continuous monitoring, and formative and authentic evaluation that involves all participants in the educational process. Feedback should support students’ learning by providing clear explanations of grades and constructive and relevant advice, combined with the teacher’s supportive attitude and a positive tone, while also encouraging self-evaluation. It should also include specific descriptions of how to improve and be delivered in a timely manner (Butcher, 2004).

However, in practice, the emphasis is placed mostly on results and student performance on tests. Experiences leading to better test results are often prioritized. This issue is currently a major challenge to the promotion of active learning in Croatia considering that, besides the state graduation exams taken at the end of high school, standardized national assessments are also being introduced at the primary school level, thereby reinforcing a culture of teaching to the test. McGrath and MacEwan (2011) pointed out that, although the importance of engaging students in various activities, creativity, and innovative approaches to learning is often highlighted, assessments of student learning often remain traditional, as do students’ responses, reflecting their prior schooling experiences. From an activity-based education perspective, assessments of student learning should focus not only on understanding the subject matter, but also on how students apply, integrate, and reflect on their learning. Assessments that support active learning should include challenging tasks which encourage higher-order thinking, emphasize the learning process and its outcomes, and function as a continuous process integrated into teaching to support student learning (Shepard, 2000). The method of assessing student work significantly affects their subsequent motivation and the strategies they adopt in future learning.

The study of selected determinants of active learning provides a foundation for enhancing the quality of the Croatian education system, which is currently undergoing a curricular reform. These determinants address the weaknesses of the national system and the challenges it faces, directly support the purpose and objectives of the reform, and contribute to its effective implementation and evaluation. All determinants of active learning are interconnected, with some overlapping to emphasize the same purpose and others complementing other characteristics of active learning. Based on their integrated functioning, these determinants connect the theoretical and practical aspects of active learning. Significant learning is essential to ensure that active learning is understood clearly and not merely equated with student activity in the classroom.

Previous research on active learning has identified its advantages, barriers to implementation, contrasts with traditional learning, and opportunities for improvement. The growing body of literature on active learning analyzes the concept from various perspectives in educational contexts. Research on active learning at the primary and high school level continues to show the dominance of traditional teaching across various countries (Abbott & Fouts, 2003; Bolhuis & Voeten, 2001; Carnell, 2005). Reviews of relevant studies by Freeman et al. (2014), Michael (2006) and Prince (2004) demonstrated the advantages of active learning, indicating broad but inconsistent support for its core elements. These studies emphasized that active learning supports students in mastering challenging subjects. A meta-analysis of 225 studies in STEM fields, conducted by Freeman et al. (2014), showed that active learning improves academic success, conceptual thinking, and overall achievement, making it more effective than traditional lectures. Active learning enhances academic success and student learning outcomes (Abbott & Fouts, 2003; Michel et al., 2009; Newmann et al., 2001; Nguyen et al., 2021). In an extensive study involving approximately 5000 students aged 9 to 14, Newmann et al. (2001) found that students who were assigned tasks requiring more active and intellectually demanding work achieved higher average scores on standardized tests measuring basic reading and math skills. Further studies have shown that active learning leads to a deeper understanding of the subject matter (Acar Sesen & Tarhan, 2010; O'Grady et al., 2014; Taraban et al., 2007).

The aim of this study was to examine the determinants of active learning in contemporary teaching from the perspective of students and teachers in Croatia. This approach sought to give an insight into the students' and teachers' evaluation of the application and understanding of active learning in contemporary classrooms. Based on this aim, the following research hypotheses were formulated:

H1. Differences are expected between the primary and high school students' evaluation of the determinants of active learning.

H1.1. Students with higher overall academic achievement at the end of the previous school year assess the determinants of active learning more positively compared to students with lower overall academic achievement.

H1.2. Students who participate in extracurricular and out-of-school activities assess the determinants of active learning more positively compared to students who do not participate in extracurricular and out-of-school activities.

H1.3. There are no differences in the evaluation of the determinants of active learning based on gender.

H1.4. Younger students (primary school) assess the determinants of active learning more positively compared to older students (high school).

H2. Differences are expected between the primary and high school teachers' evaluation of the determinants of active learning.

H2.1. Teachers who have participated in professional development in the area of active learning assess the determinants of active learning more positively compared to teachers who have not participated in such professional development.

H2.2. There are no significant differences in the evaluation of the determinants of active learning based on age, gender, years of professional experience, or the subject area.

H3. Differences are expected between the students' and teachers' evaluation of the determinants of active learning, with teachers giving a more positive evaluation.

The research hypotheses are grounded in theoretical frameworks, research problems, and the findings of relevant previous studies addressing various aspects of active learning.

Hypothesis H1 and sub-hypothesis H1.4 are based on developmental differences among students in the context of learning and motivation. Previous research has shown that students' motivation to learn declines with age, particularly during adolescence (Bong, 2001; Wigfield & Eccles, 2000). Studies by Wigfield and Eccles (2000) and Bong (2001) indicate that younger students demonstrate higher levels of motivation and more positive attitudes toward learning compared to

older students. Hypothesis H1.1 is based on the research indicating that students with higher academic achievement tend to exhibit greater intrinsic motivation and more positive attitudes toward teaching methods that promote active learning (Schunk et al., 2014), as well as on findings that student engagement in the learning process is a strong predictor of academic success (Klem & Connell, 2004; Willingham et al., 2002). In the context of this study, academic achievement refers to students' overall grade point average at the end of the school year, expressed as a final numerical grade ranging from 2 to 5, in accordance with the Croatian grading system. Higher academic achievement is defined as a final grade of 'very good (4)' or 'excellent (5)', while lower academic achievement includes grades of 'sufficient (2)' and 'good (3)'. Sub-hypothesis H1.2 is grounded in the research by Gardner et al., (2008), and Jurčić (2008), the results of which indicated that participation in extracurricular and out-of-school activities supports the holistic development of students, enhances their engagement in regular classroom instruction, improves academic achievement, and contributes to their adaptation to school demands. Sub-hypothesis H1.3 is based on the constructivist foundation of active learning, where the learning process is individualized and emphasizes the importance of experiential and collaborative learning, critical thinking, reflective practice, autonomy, personal responsibility for learning, and connecting classroom content with real-life contexts. Learning is understood as a result of interaction between prior experiences and the educational environment (Kolb, 1984), while differences among students are most often reflected in their individual abilities and the characteristics of the classroom setting (Severiens & Ten Dam, 1998).

Hypothesis H2 was formulated considering the strong focus placed on student performance in standardized national assessments. In Croatia, these are primarily the state graduation exams, which determine admission to higher education following the completion of grammar school education. Consequently, both student learning and teacher instruction are mostly focused on preparing students for the state graduation exams, which in turn limits the implementation of active learning approaches in high schools. Similar findings have been reported in studies conducted in other countries (Berliner, 2011; Drew & Mackie, 2011). Sub-hypothesis H2.1 is based on the assumption that teachers improve their instructional practice through continuous professional development (Desimone et al., 2002), including the domain of active learning. This was confirmed in the study by O'Grady et al. (2013), who emphasized the importance of teachers' engagement in deeper professional dialogue to fully understand the benefits of active learning. Sub-hypothesis H2.2 builds on the author's previous research (Gazibara, 2016a) on active learning from the perspective of primary school teachers within the Croatian educational context. Teachers' years of professional experience were categorized into four groups: up to 10 years, 11–20 years, 21–30 years, and 31 or more years. Educational fields were defined according to the Croatian National Curriculum (Fuchs et al., 2011) and they include: the language and communication field, the mathematical field, the natural sciences field, the technical and ICT field, the social sciences and humanities field, the arts field, and the physical and health education field.

Hypothesis H3 is based on previous research indicating that teachers tend to hold more positive views regarding certain aspects of active learning, particularly in relation to classroom environment and teaching methods (Den Brok et al., 2006; Könings et al., 2014).

2. Method

2.1. Research Design

A descriptive research design was used in this study, selected in accordance with the research aim, which focused on examining the determinants of active learning in contemporary teaching from the perspective of students and teachers in Croatia. This design allows for the presentation and analysis of the participants' perceptions through quantitative data collected using structured questionnaires (Creswell, 2014).

2.2. Participants

The study included a total of 951 students from primary schools (8th grade, $N = 458$) and high schools (4th grade, $N = 493$) in Croatia. Eighth-grade primary school students and fourth-grade high school students were selected for the study due to the fact they spent the most time in the education system. The assumption was that this experience made them the most competent to evaluate the variables of the determinants of active learning. A total of 280 teachers participated in the survey as well, all of whom taught the surveyed students at the schools involved in the study. The criterion for selecting the sample of teachers was that they taught the surveyed students because the aim was to provide the most reliable insights into the similarities and differences in the evaluation of the determinants of active learning. The total study sample consisted of 1231 participants.

2.3. Data Collection

This study was part of a doctoral dissertation study. In this study, the Questionnaire on Didactic-Methodological Determinants of Active Learning was used as part of the survey instruments for both the students and teachers. The determinants of active learning were operationalized through five subscales in the questionnaire: active learning environment, significant learning, teaching methods and patterns of interaction in active learning, active learning continuums, and barriers to active learning.

The independent variables included the sociodemographic characteristics of the participants. In case of students, these variables included their age, gender, school, overall academic achievement at the end of the previous school year, involvement in extracurricular activities, and participation in out-of-school activities. The sociodemographic variables for the teacher questionnaire included age, gender, the type of school in which they worked, their subject area and subject taught, years of teaching experience, and involvement in professional development related to active learning. The dependent variables consisted of the determinants of active learning.

The factor structure of the questionnaire was assessed using confirmatory factor analysis [CFA]. The questionnaire consisted of Likert-type scales with five response options, where higher scores indicated a greater presence of each construct. The scores are expressed as average ratings by the students and teachers for items of the respective subscales.

The study was conducted in 2017 in primary and high schools in the Osijek-Baranja County. Prior to surveying the eighth-grade students, parental consent was obtained. The study complied with the Code of Ethics for Research with Children.

2.4. Data Analysis

Descriptive statistics and a series of one-way analyses of variance (with Bonferroni correction) were used to examine the differences in the perception of the determinants of active learning, as well as its individual aspects, based on the sociodemographic characteristics of the participants. Prior to data analysis, the assumption for the use of parametric statistical procedures was tested – namely the normality of distribution for the variables included in the study. The Kolmogorov-Smirnov test indicated a statistically significant deviation from normal distribution for nearly all variables used in the study ($K-S$ values ranged from .04 to .10; $p < .05$), with the exception of the variable “determinants of active learning” (.032, $p > .05$). However, it is important to note that with large sample sizes – as is the case in this study – the Kolmogorov-Smirnov test often produces statistically significant results, meaning that the null hypothesis of normality is frequently rejected (Howell, 2010). Furthermore, the results across all (sub)scales indicate a tendency toward clustering around higher values, i.e., a negatively skewed distribution (skewness values ranging from -0.02 to -0.48) and a leptokurtic distribution (kurtosis values ranging from 0.04 to -0.86). Although these skewness and kurtosis indices deviate from zero, which is characteristic of normal distribution, they remain well within the acceptable thresholds: skewness < 3 , kurtosis < 8 (Kline, 2005). Given the large sample size in this study, corresponding z -values for

skewness and kurtosis indices were not calculated. In large samples ($N > 200$), there is an increased risk of obtaining statistically significant results even when skewness and kurtosis values do not deviate from normal distribution meaningfully. Additionally, for large samples, visual inspection of data distribution is recommended. In this case, such inspection was conducted, and based on the visual examination of histograms and Q-Q plots, deviations from normality were determined to be minor, indicating that the distributions generally tend toward normality. As an additional indicator, skewness and kurtosis coefficients were considered and found to fall within the acceptable range for approximate normal distribution (± 1). Accordingly, it can be assumed that the observed deviations are unlikely to affect the outcomes of further analysis substantially, and parametric statistical procedures were therefore used in the data analysis.

The research data were analyzed using IBM SPSS (v. 22.0) and IBM SPSS for AMOS (v. 20).

3. Results and Discussion

This chapter presents and analyzes the results of the study. First, descriptive indicators are presented and interpreted to provide an insight into students' and teachers' evaluation of the presence of active learning determinants. This is followed by the presentation and analysis of inferential statistical results conducted to test the stated hypotheses.

3.1. Descriptive Indicators of the Evaluation of Active Learning Determinants

Descriptive statistics of the students' and teachers' evaluation of the prevalence of the determinants of active learning, as well as its individual aspects, are presented in Table 1.

Table 1

Students' and teachers' evaluation of the prevalence of the determinants of active learning

	N		M		SD	
	T	S	T	S	T	S
Determinants of Active Learning	230	705	3.76	2.97	0.48	0.69
Active Learning Environment	260	892	3.76	2.85	0.77	0.94
Significant Learning	278	916	3.96	3.01	0.61	0.89
Teaching Methods and Patterns of Interaction in Active Learning	255	858	3.77	2.97	0.63	0.79
Active Learning Continuums	272	862	4.17	3.21	0.52	0.80
Barriers to Active Learning	263	897	2.87	2.79	0.75	0.64

Note. N: Number of participants; M: Mean; SD: Standard deviation; T: Teachers; S: Students

As shown in Table 1, the students rated the prevalence of various aspects of the determinants of active learning, as well as the overall determinant of active learning, with lower scale values. Both the students and teachers gave the lowest score to barriers to active learning, with students also giving a low score to active learning environment. Among the examined variables, active learning continuums, ranging from passive to active student engagement, received the highest score from the students and teachers.

From the students' perspective, the potential for improving active learning in contemporary teaching is reflected in the average score given to the determinants of active learning overall ($M = 2.97$), as well as to barriers to active learning ($M = 2.79$), active learning environment ($M = 2.85$), and teaching methods and patterns of interaction in active learning ($M = 2.97$). These determinants of active learning received the lowest scores from the students. The analysis of the barriers to further promotion of active learning in contemporary teaching is presented in Tables 2, 3, and 4.

After recoding all the subscale items related to barriers to active learning, it was observed that the students considered the complexity of active learning to be its greatest barrier, perceiving it as requiring too much time and effort ($M = 2.29$). This is followed by the lack of time for implementing active learning due to the extensive subject matter covered in lessons ($M = 2.46$), a

Table 2

Descriptive statistics of the students' and teachers' evaluation of the determinant of active learning – Barriers to Active Learning

Barriers to Active Learning	Students			Teachers		
	N	M	SD	N	M	SD
Lack of time (coverage of subject matter)	946	2.46	1.24	279	2.40	1.13
Requires too much time and effort	946	2.29	1.14	277	2.97	1.08

Note. N: Number of participants; M: Mean; SD: Standard deviation.

view also shared by the teachers ($M = 2.40$). These same barriers were also highlighted in the studies by Børte et al. (2020), Machemer and Crawford (2007), and Niemi (2002) across all levels of education. The lack of time and the effort required to organize active learning activities are related to the conceptual understanding of active learning itself, as well as to the existing structures and culture of the school, which have been identified in previous research as challenges in the implementation of active learning (Børte et al., 2020; Niemi, 2002).

Table 3

Descriptive statistics of the students' and teachers' evaluation of the determinant of active learning – Active Learning Environment

Active Learning Environment	Students			Teachers		
	N	M	SD	N	M	SD
The classroom has the appearance and atmosphere of a living space.	945	2.43	1.34	268	3.14	1.30
Spaces are provided for special forms of student work.	948	2.59	1.34	277	3.01	1.30
The atmosphere is challenging and attractive.	949	2.27	1.23	278	3.34	1.11
My participation in learning is supported.	946	3.16	1.18	279	4.15	0.82
A warm and positive atmosphere is supported and developed.	946	2.90	1.24	279	4.30	0.76

Note. N: Number of participants; M: Mean; SD: Standard deviation.

The results on the “Active Learning Environment” scale indicate that the students gave the lowest score to the aspect of challenge and attractiveness of the active learning atmosphere ($M = 2.27$), followed by the appearance and atmosphere of the classroom as a living space ($M = 2.43$) (see Table 3). In contrast, the teachers had a more positive perception of the active learning environment. Their evaluation of almost all items had an average scale value of around four, generally agreeing that the specified determinants are present in the teaching environment. The teachers' evaluation of the classroom's appearance and atmosphere as a living space aligned with the students' and received a relatively low score ($M = 3.14$), similarly to the availability of spaces for special forms of student work ($M = 3.01$). The teachers evaluated the support and development of a warm and positive atmosphere with a high score ($M = 4.30$), similarly to support for student participation in learning ($M = 4.15$). However, this highlights a divergence in the perception between students and teachers, with the former not acknowledging a warm and positive atmosphere in their classroom ($M = 2.90$).

Active learning requires a positive and stimulating classroom environment. If students feel comfortable and safe, receive support from teachers in their work, and connect learning with their own experiences and interests, active learning is likely to occur. Therefore, successful implementation of active learning necessitates ensuring a warm and comfortable classroom atmosphere, providing emotional stimuli, encouraging student reflection, and presenting intellectual challenges that stimulate curiosity, as confirmed by other research (Baeten et al., 2010; Hailikari et al., 2022). As concerns the learning environment, from the students' perspective, the results of this study underscored the need to create a favorable environment for active learning, emphasizing the emotional and social aspects that teachers can improve. Key changes include

increasing the presence and recognition of a constructivist active learning environment that incorporates a holistic and interdisciplinary approach to learning and respects the social and emotional learning context. The theoretical foundations provided by Grabinger and Dunlap (1995) highlighted the characteristics of Rich Environments for Active Learning, which include student responsibility and initiative, generative learning activities, authentic learning contexts including authentic assessment, and collaborative support. Such developments require changes in the traditional roles of teachers and students, where the teacher guides and directs students' learning towards self-regulation and the development of lifelong learning competencies.

Table 4

Descriptive statistics of the students' and teachers' evaluation of the determinant of active learning – Teaching Methods and Patterns of Interaction in Active Learning

Teaching Methods and Patterns of Interaction in Active Learning	Students			Teachers		
	N	M	SD	N	M	SD
Creative learning techniques	948	2.63	1.24	279	3.99	0.90
Case studies	935	2.67	1.17	274	3.57	0.95
Individual work	944	3.81	1.01	278	4.20	0.74
Pair work	946	3.77	1.03	279	4.14	0.82
Group work	948	3.64	1.08	277	4.03	0.86
Learning through movement	946	2.01	1.19	277	2.91	1.30
Outdoor teaching and field trips	935	2.58	1.29	274	3.35	1.16

Note. N: Number of participants; M: Mean; SD: Standard deviation.

The students' evaluation of teaching methods and patterns of interaction promoting active learning has shown they are not implemented sufficiently in teaching practice. Learning through movement is the least represented one, as acknowledged by both the students and teachers ($M = 2.01$ for students, $M = 2.91$ for teachers). Although its importance is highlighted in the Croatian National Curriculum Framework, it is rarely implemented in practice. It can be found as part of the school curriculum, in extracurricular and out-of-school activities, and cultural and public-school activities, primarily in the lower grades of primary schools (Gazibara, 2016a). The integration of movement into regular teaching is still not a practice in the Croatian education system, as evidenced by this study. The universal language of movement and dance facilitates integrative processes and contributes to the development of a student-centered curriculum, which is an important element of active learning. This is supported by research findings in this area, which include positive impacts on improving academic achievements, development of creativity (Quin et al., 2007), development of social competencies (Giguere, 2011), and contributions to overall personality development (Geršak, 2012).

Alongside learning through movement, students and teachers also rated outdoor teaching and field trips as the least represented activities ($M = 2.58$ for students, $M = 3.35$ for teachers). Furthermore, the students' evaluation points to a lack of application of creative learning techniques ($M = 2.63$) and case studies ($M = 2.67$). Other research, in line with this study, highlighted the value of outdoor education for developing problem-solving skills and connecting learning with real life and student motivation (Dettweiler et al., 2015; Dillon et al., 2006; Karppinen, 2012; Kuo et al., 2018; Martin, 2010). For example, Dillon et al. (2006) analyzed 150 studies on outdoor learning conducted in various countries, aiming to improve its implementation in high schools. They concluded that outdoor learning has numerous positive effects on students, enhances the development of cognitive skills, and contributes to more positive attitudes toward learning. These findings are supported by Martin (2010) in the Australian context, as well as by Dettweiler et al. (2015), whose research showed that students engaged in outdoor learning demonstrate higher levels of self-regulated learning and motivation compared to those in classroom-based settings. Furthermore, Karppinen (2012), in his action research on outdoor learning as part of the school curriculum in Finland, concluded that learning in nature and the development of ecological awareness will become increasingly important in addressing future

educational challenges. He also emphasized that outdoor education contributes to students' motivation and well-being. An experimental study conducted by Kuo et al. (2018) with third-grade primary students in the United States showed that participation in outdoor learning enhances students' engagement even in subsequent classroom-based instruction. The value of these active learning methods lies in connecting teaching with real-life experiences, encouraging student exploration and independence, and stimulating divergent thinking. When it comes to the patterns of interaction promoting active learning, the results indicate that individual work is the most common one in practice, followed by pair work and group work.

All examined teaching methods and patterns of interaction facilitating active learning situations require a high degree of implementation into the educational process. They must be chosen carefully, taking into account the students' developmental needs and interests. In teaching practice, lecture-based and frontal teaching are still dominant, especially in higher grades of primary school and in secondary education. Therefore, without stronger didactic and methodic diversification of teaching and learning, the recognition of active teaching will continue to be limited, and schools will remain out of touch with the life skills and competencies that students need for successful further development.

As regards the scale of determinants of active learning and its individual components, it is evident that much needs to be done regarding the determinants of active learning in general (see Table 1), particularly in addressing the barriers to active learning. A more detailed analysis of the students' and teachers' evaluation of the application and understanding of active learning in contemporary teaching can be found below. This includes examining the significance of differences in the evaluation of active learning determinants based on the sociodemographic characteristics of the participants.

3.2. Differences in the Evaluation of Active Learning Determinants Between Primary School and High School Students

To test hypothesis H1, which examined whether there were differences between primary and high school students' evaluation of active learning determinants, a one-way analysis of variance [ANOVA] with Bonferroni correction was conducted. The results of the analysis are presented in Table 5.

Table 5

Statistically significant differences in the perception of active learning determinants based on age, type of school, and participation in extracurricular and out-of-school activities (results of one-way ANOVA with Bonferroni correction)

	N	M	SD	F	Difference
Age					
14	270	3.35	0.61	46.92*** (5,696)	14 > 17, 18, 19***
15	44	3.40	0.70		15 > 17, 18, 19***
17	13	2.54	0.59		
18	34	2.66	0.56		
School Type					
PS	326	3.35	0.62	246.60*** (1,703)	PS > HS
HS	379	2.65	0.57		
Extracurricular Activities					
Yes	218	3.26	0.65	58.56*** (1,700)	Yes > No
No	484	2.85	0.67		
Out-of-School Activities					
Yes	332	3.08	0.68	15.34*** (1,699)	Yes > No
No	368	2.88	0.68		

Note. N: Number of participants; M: Mean; SD: Standard deviation; F: F-statistic and significance; PS: Primary school; HS: High school; ***: $p < .001$.

Based on the results obtained regarding the relationship between students' sociodemographic characteristics and their evaluation of active learning determinants, the first research hypothesis (H1) was largely confirmed: differences are expected in the evaluation of active learning determinants between primary and high school students.

Contrary to expectations, sub-hypothesis H1.1 – that students with higher overall academic achievement at the end of the previous school year would assess the determinants of active learning more positively than those with lower achievement – was not confirmed. This finding suggests that teachers create similar learning conditions for all students, regardless of their academic performance. This assumption was based on previous research indicating a strong association between student engagement and academic achievement (Klem & Connell, 2004; Willingham et al., 2002) as well as on the findings by Schunk et al. (2014), which showed that students with higher academic achievement tend to exhibit greater intrinsic motivation and more positive attitudes toward active learning methods. The rejection of sub-hypothesis H1.1 can be interpreted in the context of students' perceptions and attitudes toward active learning, which are not necessarily determined solely by their overall academic achievement, but also by other important factors. Specifically, students' perceptions of active learning may be influenced by their previous learning experiences in the classroom, and in the Croatian educational context, traditional, teacher-centered instruction was more prevalent prior to recent reform processes (Peko & Varga, 2014). In addition, students' perceptions of active learning are influenced by assessment practices, the school environment, and teacher support in the learning process. These findings are supported by the study conducted by Ristić Dedić and Jokić (2014) on a sample of 4716 primary school students in Croatia, which explored school-based learning support and students' reasons for learning. The authors emphasized that the main motivation for learning was linked to achieving high grades and gaining admission to the desired high school. The most problematic aspects are seen in the existing patterns of student assessment and grading, which tend to encourage learning for the sake of testing and grades, as well as subject curricula that do not correspond to students' interests or cognitive capabilities. Therefore, it can be concluded that the relationship between active learning and academic achievement is not straightforward. Rather, it should be viewed within a broader context, one that considers the individuality of each student and their prior learning experiences.

Sub-hypothesis H1.2 – students who participate in extracurricular and out-of-school activities assess the determinants of active learning more positively compared to those who do not – was confirmed by the results of the study. Specifically, students who participated in extracurricular and out-of-school activities gave a significantly more positive evaluation of active learning determinants (extracurricular activities: $F(1, 700) = 58.56, p < .001$; out-of-school activities: $F(1, 699) = 15.34, p < .001$). This may be explained by the greater opportunities for developing active learning skills through participation in such activities. In extracurricular and out-of-school activities, students are free to choose activities based on their needs and interests, which fosters higher intrinsic motivation and serves as a foundation for the development of active learning processes. In line with the findings of this study, similar research has shown that participation in extracurricular and out-of-school activities promotes students' holistic development, contributes to academic achievement and adaptation to school demands, and supports student engagement in the teaching and learning process (Gardner et al., 2008). To promote active learning within extracurricular activities, special attention should be given to the use of teaching methods and social forms of learning that support active engagement. This approach was confirmed by Pejić Papak and Vidulin-Orbanić (2011) in their study involving 257 teachers who led extracurricular activities in primary schools. As the results of this study indicated that only a smaller number of students participated in extracurricular and out-of-school activities, additional encouragement is needed to increase student involvement. It is necessary to highlight the benefits and importance of such activities for holistic development, thereby contributing to a better understanding of the value of active learning.

The students' evaluation showed no differences based on gender on the active learning determinants scale, thereby confirming sub-hypothesis H1.3. These findings are consistent with those of Severiens and Ten Dam (1998), who found that differences among students are more commonly reflected in their abilities and classroom environment as stimuli for active learning. However, in the context of this study, these results should be interpreted with caution due to the sample structure, specifically gender imbalance, considering that a higher proportion of female students (60.7%) participated in the study. This needs to be highlighted since previous research has pointed to gender differences (Buljubašić-Kuzmanović, 2012; Topolovčan & Matijević, 2017). For example, in a study conducted by Buljubašić-Kuzmanović (2012) on a sample of 1337 primary school students, it was found that girls reported having more frequent opportunities to demonstrate their skills and abilities compared to boys. Gender differences in students' perceptions of constructivist learning were also confirmed in a study by Topolovčan and Matijević (2017), which showed that girls were more inclined to emphasize the personal relevance of learning, critical thinking, and student negotiation than boys. Furthermore, during adolescence, students begin to perceive themselves and their abilities in new ways, and girls tend to experience these developmental changes earlier than boys, as early adolescence typically begins about two years earlier for girls (Halpern, 2000).

The results indicate significant differences in the evaluation of the determinants of active learning based on the students' age ($F(5,696) = 46.92, p < .001$). Younger students (aged 14 and 15) gave a more positive evaluation of the determinants of active learning than older students (aged 17-19). This confirms sub-hypothesis H1.4 of the study – that younger students (primary school) assess the determinants of active learning more positively compared to older students (high school). These findings indicate that, from the students' perspective, active learning is more present in teaching practices with younger learners. In the context of secondary education, the need for a shift toward active learning has also been highlighted in previous research by Bolhuis and Voeten (2001) and Carnell (2005), with an emphasis on the importance of continuous professional development of teachers (Fletcher-Wood & Zuccollo, 2020). These results confirm the need to further encourage the implementation of active learning determinants in practice, particularly in teaching older students, and to continue their development and application in high school settings.

3.3. Differences in Teachers' Evaluation of Active Learning Determinants Between Primary and High Schools

To test hypothesis H2, which assumed that there were differences between primary and high school teachers' evaluation of active learning determinants, a one-way analysis of variance with Bonferroni correction was conducted as well. The results of the analysis are presented in Table 6.

Table 6

Statistically significant differences in teachers' perceptions of active learning determinants according to school type and participation in professional development (results of one-way ANOVA with Bonferroni correction)

	N	M	SD	F	Difference
School Type					
PS	144	3.85	0.42	14.88*** _(1,228)	PS > HS
HS	86	3.61	0.53		
Professional Development					
Yes	158	3.86	0.47	24.28*** _(1,224)	Yes > No
No	68	3.53	0.42		

Note. N: Number of participants; M: Mean; SD: Standard deviation; F: F-statistic and significance; PS: Primary school; HS: High school; ***: $p < .001$.

The differences in the teachers' perception of the determinants of active learning based on their sociodemographic characteristics align with the patterns observed in the students' evaluation.

Notably, the teachers' evaluation varies significantly depending on the type of school in which they work, thereby confirming hypothesis H2. Primary school teachers perceive the determinants of active learning more positively ($F(1,228) = 14.88$, $p < .001$) than high school teachers. These findings align with the students' evaluation, suggesting that active learning determinants are more common in primary education. The average score given by primary school teachers was around four, indicating a general presence ("generally present," $M = 3.85$). In the final years of high school in Croatia, there is a lot of pressure on teachers to prepare students for the state graduation exams. This focus often results in teaching practices that remain traditional, centered around knowledge transmission (Drew & Mackie, 2011). Despite these challenges, it is necessary to persuade teachers of the benefits of active learning in enhancing student achievement, as supported by extensive research (Abbott & Fouts, 2003; Freeman et al., 2014; Taraban et al., 2007). Without stimulating students' abilities to construct and co-construct knowledge and engage in significant learning by applying methods that promote their active participation, the development of lifelong learning competencies is impeded.

As expected, the teachers' participation in professional development related to active learning led to a more positive evaluation of the determinants of active learning and their increased application in practice ($F(1,224) = 24.28$, $p < .001$). These results confirm sub-hypothesis 2.1 of the study. Continuous professional development in active learning can enhance teaching practices. Despite 70.4% of the teachers participating in professional development, the application of active learning remains insufficient. This highlights the need for better professional development programs and significant changes, including the organization of professional development activities, its continuity, and the attitudes and motivation of teachers toward it. Other research, which is consistent with the findings of this study, has also raised concerns about the organization of professional development and the directive approach that may hinder teachers' autonomy and creativity (Hubers et al., 2020; Kraft & Papay, 2014; Methlagl, 2022). For example, in their study on professional environments in schools as a driver of teacher development, Kraft and Papay (2014) emphasized the importance of a supportive school context for implementing change, as well as the need for professional development to be organized in a way that enhances teachers' pedagogical and methodological expertise. Challenges related to the organization of teacher professional development in the fields of science and technology were highlighted in the study by Hubers et al. (2020), who emphasized the need for alignment with national, local, and school-level education policies, school culture, and the duration of professional development in order to achieve and sustain changes in teaching practice. In his exploratory study on patterns of participation in professional development, teacher collaboration, and instructional practices, Methlagl (2022) underscored the importance of systematic support for teachers when implementing changes in their teaching, as well as the organization of learning communities to maintain teacher motivation and sustained engagement in professional learning. In their research on teachers' perspectives regarding changes in teaching practices toward active learning, O'Grady et al. (2014) found that teachers need to be involved in deeper professional discussions to understand the benefits of active learning and advocated for stronger partnerships between schools and universities. To be effective and successful, professional development related to active learning must be continuous and target internal changes in teachers, enabling them to become active learners themselves. This requires a different approach, focused on exploring and changing one's own teaching practices. It is crucial that teachers participate in professional development voluntarily, are internally motivated, and receive support from their environment. Moreover, professional development must be an integrated part of the overall culture of the school as a learning organization itself (Darling-Hammond et al., 2017).

Sub-hypothesis H2.2 – that there are no significant differences in the evaluation of the determinants of active learning based on age, gender, years of professional experience, or the subject area – was also confirmed. The findings indicate these factors do not impact the perception of active learning significantly. This observation was also confirmed by Gazibara (2016b) in a study

focused on subject teachers in primary schools, concluding that years of teaching experience do not have a significant influence on the implementation of active learning.

The second hypothesis was fully confirmed by the findings about the relationship between the teachers' sociodemographic characteristics and active learning. It can be concluded that professional development is of utmost importance for the implementation of active learning. This involves teachers critically reflecting on their own competencies and being motivated to change their practices, which means they must become active learners themselves.

3.4. Differences in the Evaluation of Active Learning Determinants between Students and Teachers

A one-way analysis of variance with Bonferroni correction was also used to test hypothesis H3, which anticipated differences between students' and teachers' evaluation of the determinants of active learning, with teachers giving a more positive evaluation.

Differences in the evaluation of the determinants of active learning between students and teachers are shown in Table 7.

Table 7

Differences in the evaluation of active learning determinants between students and teachers based on the results of one-way ANOVA (with Bonferroni correction)

	N	M	SD	F	Difference
Overall Determinants of Active Learning					
Teacher	230	3.76	0.48	285.42*** _(1,934)	Teacher > Student
Student	706	2.97	0.69		
Active Learning Environment					
Teacher	260	3.76	0.77	202.51*** _(1,1151)	Teacher > Student
Student	893	2.85	0.94		
Significant Learning					
Teacher	278	917	0.61	278.02*** _(1,1193)	Teacher > Student
Student	3.96	3.00	0.90		
Teaching Methods and Patterns of Interaction in Active Learning					
Teacher	255	3.77	0.63	223.86*** _(1,1112)	Teacher > Student
Student	859	2.97	0.78		
Active Learning Continuums					
Teacher	272	4.17	0.52	345.14*** _(1,1133)	Teacher > Student
Student	863	3.21	0.80		
Barriers to Active Learning					
Teacher	263	4.17	0.52	3.33 ^{nz} _(1,1159)	-
Student	863	3.21	8.80		

Note. N: Number of participants; M: Mean; SD: Standard deviation; F: F-statistic and significance; ***: $p < .001$.

The study findings consistently demonstrate that, compared to students, teachers have a significantly more positive perception of various aspects of the determinants of active learning, as well as of the determinants of active learning overall ($F(1,934) = 285.42$, $p < .001$). The only aspect where there was no statistically significant difference in the teachers' and students' evaluation concerned the barriers to active learning, which are perceived similarly by both groups. The largest differences in the students' and teachers' evaluation can be seen in the active learning continuums ($F(1,1133) = 345.14$, $p < .001$) and the significant learning subscale ($F(1,1193) = 278.02$, $p < .001$).

Descriptive indicators on the active learning continuums subscale suggest a predominance of traditional teaching. To enhance teaching practices toward active learning, it is essential to prioritize more complex tasks in teaching, ones that promote higher levels of knowledge,

divergent thinking, and student creativity. Along with implementing teaching methods and patterns of interaction in active learning at the levels of the continuum focused on the learning process, it is crucial to consider continuums at the level of classroom interaction and student experience, as proposed by Bonwell and Sutherland (1996). The interdependence and interconnectedness of all determinants of active learning are apparent, highlighting the necessity of integrating and enhancing the classroom environment for active learning, significant learning, and removing barriers to active learning. To fully appreciate these determinants in contemporary teaching, it is important to understand their complexity and integrate them into teaching practice from the beginning of schooling, as well as to continue applying them consistently at all levels of the education system.

Significant learning, which students evaluated negatively, must be enhanced in teaching practice because it is fundamental to active learning. It involves students' personal engagement in learning, incorporating their experiences, and acknowledging the emotional and cognitive components of learning, leading to changes in their attitudes and behaviors. The teacher's role is to ensure students have broad opportunities for both integrative and social learning, taking into account their interests and abilities and encouraging self-regulated learning. An important aspect of this process is teaching students how to learn, which is one of the eight key competencies highlighted in European national curricula. Descriptive indicators showed that students gave this component a low score ($M = 2.78$), approaching level 3 ("neither disagree nor agree" that this determinant is implemented in teaching), which suggests a need for its greater integration into teaching practice. Teachers could enhance this by employing the taxonomy of significant learning developed by Fink (2013), which integrates six categories of learning: foundational knowledge, application, integration, human dimension, caring, and learning how to learn. When teaching encourages all six categories, a student's learning experience becomes significant and transformative, initiating changes in the students themselves (Fink, 2013).

The differences in teaching practices are significant, and to study this issue further, it is necessary to examine practices at the level of individual schools and initiate changes from the bottom up. Niemi (2012) also highlighted substantial individual differences among teachers in practice, associating the issue with the structure and culture of schools, which is often referred to as one of the biggest barriers to active learning (Niemi, 2002; Priestley, 2010). Research has shown that changes toward active learning are superficial and limited to individuals, which is an issue that requires a systematic and comprehensive approach with continuous development of teaching competencies. This necessitates continuity in the application of active learning, as evidenced by the research findings, which showed a greater application of active learning in primary schools compared to high schools. After initial teacher education, there is a need for continuing improvement of competencies in the area of active and lifelong learning, which would allow teachers to cope with changes effectively and implement active learning practices successfully.

Based on the findings about differences in the perception of the determinants of active learning between teachers and students, the third hypothesis of the study was confirmed, revealing that students have a significantly more negative perception of all aspects of active learning. This hypothesis raises numerous questions and issues in the implementation of active learning, indicating a need for systematic improvement of teaching practice.

4. Conclusion

Although the value of active learning has been widely acknowledged, as evidenced by numerous empirical studies and theoretical discussions, interpretations of the concept itself still vary. This leads to not making the most of all the advantages and potentials of active learning in teaching practice, with changes occurring only at a superficial level, without producing a lasting impact. This study has demonstrated that active learning is a highly complex construct requiring profound changes in teaching practice. It identified the determinants crucial for the successful implementation of active learning. The determinants take into account both the theoretical and

practical aspects of active learning, which are essential for its successful implementation. They focus on creating meaning and practical activity. In this context, the determinants can serve as a guide for teachers to enhance active learning in practice. Teachers are advised that, along with educational policy documents, they should respect the theoretical and scientific foundations of active learning, as well as the nature of learning itself, because educational policies tend to focus only on its practical application.

Guided by the determinants of active learning, teachers can identify the weaknesses they need to improve individually in their practice. Considering the significant differences in the perceptions of active learning between students and teachers, it is necessary to listen to students more. The study has shown these differences to be substantial, with a high level of significance ($p < .001$) and students giving a significantly more negative evaluation of the determinants of active learning. This revelation has opened numerous questions and challenges in implementing active learning in teaching practice, providing guidelines for its enhancement. It can be concluded that students seek greater incentives and stronger support to make active learning a part of their learning culture. This requires co-construction and partnership between teachers and students, not only in execution but also in planning and self-evaluating the active learning process. Additionally, the results have shown that primary school students perceive the determinants of active learning more positively than high school students. This fact suggests that active learning needs to be developed in practice continuously, across all subjects and areas, especially in high schools, where students are developmentally ready for deeper levels of active learning.

To avoid such considerable disparities in evaluations of active learning in the future, the culture of schools must be changed by connecting with higher education institutions that prepare and educate future teachers and other professionals, implementing active learning at all levels of education. Professional development in the area of active learning has proven to be a key factor in its promotion and development. However, the results have also highlighted certain issues with the organization and continuity of professional development for teachers in this area. In this regard, the application of active learning should start at the very beginning of education. It should interconnect all levels of education, which implies a partnership at all system levels, networking between primary schools, high schools, and higher education institutions, including the initial education of teachers. Changes in the form of active learning must start at the grassroots, with teachers playing a crucial role in its implementation and development, while also considering the role of other education stakeholders and the community. Teachers must be active learners themselves in order to encourage and develop active learning among their students effectively.

Active learning is an essential construct in contemporary teaching and serves as the foundation for motivating creative and innovative people who are aware of their learning and potential. It should not become merely another reform introduced unilaterally from the perspective of educational policies. Instead, its successful implementation is a long-term process requiring internal and substantive changes across all segments of education. These changes must be introduced, improved, systematically monitored, and developed on a continuous basis.

5. Limitations and Recommendations for Further Studies

Considering the results of this study, certain limitations and recommendations for further research can be identified. A limitation of this study is that the data were collected solely using a quantitative method. Qualitative methodology could provide a deeper understanding of the perspectives on the determinants of active learning, and it is recommended to complement the study with focus group discussions and classroom observations. The findings cannot be generalized as they encompass only one region in Croatia. To enhance the validity of the study, it would be beneficial to include all the regions and adopt a more global approach in future research. Furthermore, future studies should consider incorporating other levels of education, expanding the sample to include teacher education students and preschool institutions as well. Due to constant changes in education, it is also essential to consider the temporal limitations of the study.

In this context, a longitudinal study would provide more insights into potential changes in the participants' perspectives. Since active learning is a complex concept, the research instrument should also be continuously evaluated and updated.

Author Contributions: Each author contributed equally to the present study and has read and approved the final version of the article for publication.

Declaration of interest: The author declared that there were no potential conflicts of interest.

Data availability: The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethical declaration: Data collection and analyses of collected data were conducted with the consent of all subjects who participated in the study. They were informed about the study's purpose, procedures, and their right to withdraw at any time without consequence.

Funding: No funding source is reported for this study.

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