

Frequency of Implementation of Contextual Teaching and Learning in Subject Teaching

Sonja Kovačević and Joško Barbir

University of Split, Faculty of Humanities and Social Sciences

Abstract

This paper presents the results of a study on the frequency of implementation of contextual teaching and learning (CTL) from the perspective of primary school teachers examining three basic dimensions: Connection and Application, Research and Developmental Nature of Knowledge, and Independence and Involvement, which are essential characteristics of CTL. The obtained research results indicate that teachers relatively rarely implement CTL in teaching, especially in terms of Research and Developmental Nature of Knowledge and Independence and Involvement. Differences were also identified with respect to the socio-demographic variables examined.

Key words: active learning; authentic setting; constructivism; curricular approach

Introduction

In order to meet the expectations of living and working in modern society, there is a growing interest in quality education, which requires changes in the teaching process. Teamwork, responsibility for personal development and the development of society, cooperation, innovation and entrepreneurship are the demands placed on individuals and education systems. "Education for quality life in the 21st century is aimed at building competences that are necessarily different from those that prevailed in the past and is based on productive general and specific knowledge that a person successfully manifests and applies outside the educational context" (Vrkić Dimić, 2013, p. 49). This is possible when students recognise the importance of what they are learning and are able to connect the content to the context of personal, social and cultural circumstances. Therefore, it is not expected that the planned changes can be realised with the still prevailing class-subject-hour system and teaching that focuses on the teacher and the content rather than on the students (Cuban, 2007). For this reason, ideas and practices that place the student at the centre of the teaching process are

increasingly emphasised (O'Sullivan, 2004). The realisation of such teaching practices implies the application of contextual teaching and learning (CTL), which emphasises the importance of meaningful activities. This teaching approach observes learning as an activity that extends beyond the mere acquisition of content and the application of what has been learned in different contexts (Wirth & Perkins, 2008). This study provides insight into the current state of teaching practice and indirectly delivers findings on the necessary competence-related, organisational and material conditions to improve the quality of teaching. The research results not only represent a diagnosis of the situation but also raise questions about the content of basic teacher education, professional and in-service training and approaches to curriculum development and implementation. The data obtained can be used to review one's own practice, understand CTL and introduce changes to implement it in the classroom.

Context and contextual teaching approach

The term *context* was used in the humanities and social sciences at the end of the 20th century and defined by Verbitsky & Kalashnikov (2012, p. 118) as a psychological context "(...) a system of internal and external factors and conditions of human behaviour and activity that influence the features of perception, understanding and transformation of a particular situation and that determine the meaning and sense of the situation as a whole and its components". It is a mental mechanism that creates meaning and sense. Oers (1998) interprets context as a mental framework, a learning situation and an activity, but regardless of whether we view it as a static situation or as different interpretations of situations, it is important that meaning emerges from situations that have social significance and provide a context for meaningful learning. The interpretations of context relate to the individual and their actions in the socio-cultural environment, "(...).... However, this is not a mechanical or purely logical relationship. Actions are always interpreted as more or less meaningful realisations of an activity, given the current goal, the motive, the available means and the rules to be followed". In teaching, it is not possible to separate these interpretations, but they must be considered as a whole in learning and teaching (Oers, 1998; Gorodetsky, Keiny, Barak & Weiss, 2003; Vrkić Dimić, 2011). Since context is perceived as a mental framework, but also as a specific situation, it may be argued that there is a connection between the psychological and didactic context because it is pedagogically important in teaching to realise how the learning process takes place in terms of discovering meaning and gaining insight into the purpose and purposefulness of the content to be learnt. The pedagogical aspect of context is important for the design of the teaching environment and learning content (Purković, 2016). The didactic aspect of context determines the meaning of the teaching content by linking it to social interactions and learning situations, thus creating a stimulating environment. Given the recursive nature of human activity, newly acquired information is constructed in the context of previous mental states and can only be perceived and interpreted on the basis of previous experiences (Zinchenko, 2001; Rubinstein, 2003) and "no information exists

outside of context” (Verbitsky & Kalashnikov, 2012. p. 124). This interpretation of context suggests that context and cognition are inextricably linked (Rogoff, 1990) and that all cognition is context-dependent (Tweney, 1998). Since knowledge is constructed in the current understanding of the situation and physical and social interaction, the contextual teaching approach is indisputably based on constructivism, enabling learners to construct knowledge through specific situations and lived experiences (Vrkić Dimić, 2011). The contextual teaching approach combines problem-based learning, inquiry and project-based learning, collaborative learning and the assessment of authentic knowledge. The aim of this approach is to connect school learning with real life (Schell & Schell, 2008). It follows that the understanding of how knowledge is constructed and the role of the teacher in the teaching process are directly linked (Nespor, 1987). Since there is no “best” teaching approach or strategy, it is up to the teacher to choose those strategies that enable students to understand and apply knowledge. As one of the possible solutions, the CTL strategies (Crawford, 2001) were developed as a result of research on CTL-based teaching practice, evaluation of teaching performance and teachers’ experiences (CORD, 1999; Navarra 2006; Ūltay & Çalik, 2012). In fact, the Centre for Occupational Research and Development has developed REACT learning strategies, which are interrelated and based on the characteristics of CTL (CORD, 1999; Crawford, 2001). The relating strategy refers to learning in the context of life experience and enables students to connect the acquired knowledge to new situations and different contexts (Johnson, 2002). The experiencing strategy promotes learning by exploring, discovering and connecting new information to previous or newly acquired experiences. The applying strategy implies the application of new knowledge in different contexts and allows students to actively participate in solving problem situations. The co-operating strategy involves working in small groups and refers to learning through the exchange of ideas and communication with each other. The transferring strategy is based on students’ prior knowledge and refers to the application of knowledge and skills in new situations and contexts. These strategies make a significant difference between the teaching approaches because the contextual teaching approach emphasises the importance of understanding the content as opposed to memorising facts. After all, understanding the content enables transfer to different contexts (Crawford, 2001). These strategies enable learning through student activity and experience and the ability to take responsibility for their own learning.

Teacher’s role in a contextual teaching approach

The role of the teacher is to promote the need for critical thinking, enquiry and the development of students’ ability to perceive content in different contexts (Crawford, 2001; De Putter & Lesley, 2012). A teacher’s ability to reshape teaching content according to the principles of CTL is referred to as context management (De Putter & Lesley, 2012), which focuses teaching activities on the connection, mediation and application of learning content. The teacher is seen as a facilitator in the process of knowledge construction, suggesting learning methods to students, involving students

and encouraging their independence in order to achieve a high degree of self-regulation in learning. In the context of student involvement, there is a *continuum of control in teaching*, which indicates the direction of teaching and is determined by three levels of teacher control: strong control, shared control and weak control (Vermunt & Verloop, 1999 in De Putter & Lesley, 2012). The role of the teacher as a facilitator and moderator is realised in the weak control domain, which implies student-centred teaching, autonomy in planning, assessment of own performance, self-regulation, development of metacognitive skills and the use of teaching methods and strategies that enable extensive reciprocal interactions important for intrinsic motivation, understanding and application of content in different contexts (De Putter & Lesley, 2012; Gazibara, 2018; Purković, 2016; Johnson, 2002). Numerous studies have shown that teachers experience difficulties in transitioning from teacher-centred to student-centred teaching (Hollingsworth, 1989; Neale, Smith & Johnson 1990; Peterman, 1991; Bell & Pearson, 1991; Loudon & Wallace, 1994; Stofflett & Stoddart, 1994) precisely because of their initial beliefs and perspectives regarding the role of teachers, learning and teaching (Wildy & Wallace, 1995).

Methodology

The subject of this research is the implementation of CTL in the classroom. The aim of the study is to examine:

- the frequency of implementation of CTL elements in the classroom according to the teachers' assessment,
- to determine the differences in teachers' self-assessments in relation to the independent variables of age, years of service and teaching field.

In line with the stated aim of the research, the following research questions were formulated:

1. To what extent do teachers perceive that the elements of CTL are represented in the classroom?
2. Are there differences in the assessment of the representation of the elements of CTL in relation to the teachers' age, years of service, and teaching field?

Research Sample

A total of 421 primary school subject teachers in the Republic of Croatia participated in the research. The distribution of the sample is presented in Tables: 1 (gender), 2 (age), 3 (teaching field), and 4 (years of service).

Table 1
Representation of respondents by gender

Gender	f	%
Men	89	21.1
Women	332	78.9
Total	421	100

Note: f – frequency, % - percentage

Table 2
Representation of respondents by age

Age	f	%
< 36 years	97	23.0
37 – 50 years	225	53.4
> 51 years	99	23.5
Total	421	100.0

Note: f – frequency, % - percentage

Table 3
Representation of respondents by teaching field

Teaching field	f	%
Natural Sciences and Mathematics	164	39.0
Language and Communication	118	28.0
Social Sciences and Humanities	65	15.4
Arts and Health	74	17.6
Total	421	100

Note: f – frequency, % - percentage

Table 4
Representation of respondents by years of service

Years of service in teaching	f	%
< 5 years	84	20.0
6 – 10 years	86	20.4
11 – 15 years	79	18.8
16 – 20 years	91	21.6
> 21 years	81	19.2
Total	421	100

Note: f – frequency, % - percentage

Research instrument

The study was conducted using a questionnaire consisting of two parts: socio-demographic data and other characteristics (gender, age, years of service, teaching field); scale of frequency of implementation of CTL in the classroom.

The scale of frequency of implementation of CTL in the classroom was designed based on the definition of CTL as a process in which students are enabled to gain insight into the meaning of the content they are learning by connecting instructional content to the context of everyday life (Johnson, 2002). Some of the statements were designed by adapting the content of examples from the literature exploring constructivist and contextual learning environments (Bošnjak, 2009; Matijević & Radovanović, 2011; De Putter & Lesley, 2012; Gazibara, 2018) and on the basis of expert interviews designed to ensure the validity of the scale. Statements were selected according to whether they were appropriate for testing the implementation of CTL.

The scale contains three subscales. The *Connection and Application* subscale consists of 16 statements that assess how often the teaching content is connected to students' existing knowledge, skills and abilities, and students' experiences from an authentic setting. The *Research and Developmental Nature of Knowledge* subscale consists of 7 statements that assess how often students have the opportunity to learn that the teaching content is developmental and dependent on cultural and social context, and how much teachers encourage active learning. The *Independence and Involvement* subscale consists of 5 statements that examine how often students can take and share responsibility for their own learning and how often they make decisions in class.

Statistical methods

The answers to questions measured with categorical measurement scales are presented descriptively with frequencies and percentages. Numerical variables are presented with arithmetic means and standard deviations, as well as frequencies and percentages. The component structure of the instrument used was verified using principal component analysis. From the components obtained, the total scores of the Connection and Application subscale, followed by the Research and Developmental Nature of Knowledge subscale and the Involvement and Independence subscale were formed by averaging the answers to all questions that saturate this component to a high degree. The theoretical range of scores is between 1 and 7, with 7 representing the highest frequency of use of the approach measured by the scale. The teaching field variable was formed by grouping the responses to the question about the subjects taught by the respondents. Difference tests were conducted in relation to age, years of service and teaching field. These variables were treated as categorical. Analyses of variance with independent samples were used to determine whether teachers of different ages, years of service and teaching fields differed in their scores on the scale obtained from the principal component analyses. Although the distributions of the individual groups deviated from normality when using t-tests and one-way analyses of variance, the number of participants in each group was large enough to ensure a normal distribution of arithmetic means using the central limit theorem, regardless of the distribution of gross scores. Welch's variants of the tests were used to correct all deviations from equality of variance. For Welch's variants of the variance analyses, Games-Howell post hoc tests were used, which also correct for deviations from the equality of variances.

Exact p-values were computed, thereby obviating the need to aggregate groups in cases where expected frequencies were below 5. In the case of statistically significant differences, adjusted standardised residuals were calculated to determine the statistical significance of the deviation of each cell from a random distribution of responses. Two-tailed tests and an alpha value of 5 % were used. Statistical processing was performed with R software, version 3.6.3 (2019, R Core Team, Vienna, Austria) and with SPSS software, version 26.0 (2018, IBM Corp., Armonk, N.Y., USA). Moderation analyses were conducted with the PROCESS add-on to SPSS.

Before conducting the factor analysis, it was determined that the intercorrelations were high enough to conduct exploratory analyses (Bartlett's $\chi^2 = 7862.17$, $p < .001$). An excellent Kaiser-Meyer-Olkin measure was achieved ($KMO = .961$) and the data were found to be suitable for factorisation. A factor analysis of the principal components with varimax rotation, communality estimation and Kaiser-Guttman criterion was performed, and 3 factors were extracted. The factors are named by analysing the content of the statements. The first factor labelled Connection and Application explains 46.37 % of the variance, the second factor, Research and Developmental Nature of Knowledge, explains 10.09 % and the third factor, Independence and Involvement, explains 4.45 %. The three-factor solution explains a total of 60.91 % of the variance in the results. The reliability analysis was performed using the internal consistency method and expressed by Cronbach's alpha coefficient. The first factor has a high internal consistency of 46.37 %, the second 10.09 % and the third a satisfactorily high consistency of 4.45 %.

Results and discussion

The results on the frequency of implementation of contextual teaching and learning in the classroom were determined using a Likert scale, which was graded in the range of 1 – never, 2 – once or twice during the school year, 3 – once or twice during the semester, 4 – several times during the semester, 5 – once a week, 6 – several times a week and 7 – daily.

The analysis of the findings obtained was carried out at the level of the results on the subscales and at the level of the statements of each subscale.

Table 5
Frequency of implementation of CTL in the classroom

Subscale	<i>M</i>	<i>SD</i>
<i>Connection and Application</i>	4.38	1.31
<i>Research and Developmental Nature of Knowledge</i>	3.74	1.14
<i>Independence and Involvement</i>	3.53	1.03

Note: *M* – mean, *SD* – standard deviation

Connection and application

The level of the arithmetic mean on the Connection and Application subscale shows that two-thirds of the teachers estimate that they connect the teaching content with the students' existing knowledge, skills and abilities several times during the semester and that the students have the opportunity to apply them in new situations and different contexts. Connecting content to real-world contexts is one of the key dimensions of CTL that enables a meaningful and complete understanding of the content being taught (Shields, 1998). The results suggest that the connection of teaching content to life contexts occurs more frequently in relation to other dimensions studied (Research and Developmental Nature of Knowledge, Independence and Involvement). The

results of the study by Karamatić, Luketić and Perin (2022) indicate that teachers in the Republic of Croatia plan activities based on students' prior knowledge, experiences and interests several times a week, which is partly consistent with the results of this study. The same research showed that teachers believe that they very often enrich the content of lessons with examples from real life and direct experience of students. This is also indicated by the results of the TALIS survey from 2018, which showed that Croatian teachers most often use problems from everyday life to illustrate the usefulness of new knowledge. CTL is also characterised by the fact that the newly learned content is linked to other teaching content. Approximately two-thirds of teachers state that they conduct lessons in which they encourage students to connect various content. It is also necessary to link teaching content to what students have previously learnt in class, as the application of newly acquired knowledge and skills in new situations is based on students' prior knowledge (Lent, Brown, Brenner, Chopra, Davis, Talleyrand & Suthakaran, 2001). The results show that two-thirds of teachers explain content relatively frequently with the help of analogies. The use of analogies in explaining content requires students to perform complex thinking operations such as analysing, synthesising, abstracting and generalising in order to think logically and solve new problems. Given that the use of analogies in teaching requires different forms of work, such as problem-solving, teaching based on questions, analyses, abstractions, generalisations, etc., it is important that students are able to use analogies in a variety of ways. The result obtained can be explained by the fact that teaching most often takes place within the traditional framework of teaching. The study showed that two-thirds of teachers relatively often organise the teaching content in a way that makes it easier for students to understand the world outside school. If the content is designed in a way that enables students to recognise relevant life situations, they are likely to be more motivated to learn (Gerlai, 1998) and apply it in authentic situations. In terms of linking content from different subjects, 48 % of teachers offer students this opportunity relatively often. Considering that only 15 % of teachers carry out this practice on a daily basis, i.e. only 11 % of them several times a week, it cannot be said that the practice of interdisciplinary linking is sufficiently represented. In fact, interdisciplinary learning activities are organised according to the needs of the students (Jensen, 2003). Interdisciplinarity in the teaching practice promotes independence and enables the active acquisition of knowledge (Sicherl-Kafol, 2002) by developing different thinking and connecting strategies (Marentić-Požarnik, 2008). Connecting instructional content allows students to fully understand and grasp the meaning of what they are learning (Shields, 1998). Most teachers estimate that they encourage students relatively frequently to recognise a particular problem in authentic situations. The importance of more frequently encouraging students to recognise a particular problem in real-life situations stems from the observation that linking teaching content to life has a positive effect on students' motivation and interest in the learning content (Gerlai, 1998). Almost 66 % of teachers state that

they relatively often show students how they can apply what they have learnt to solve everyday problems. Taking students' experiences into account is important for the effective application of CTL as a pre-requisite for cognitive and emotional involvement in the learning process, deconstruction of existing and construction of new knowledge (Watkins, Carnel & Lodge, 2007; Jelavić, 2008; Cindrić, Miljković & Strugar, 2010; De Putter & Lesley, 2012). A total of 68 % of teachers relatively often derive from students' previous experiences outside school. Linking teaching content to real-life contexts is one of the most important dimensions of CTL, as learning takes place through social interaction and the construction of personal knowledge through activities in a socio-cultural environment (Oers, 1998; Shields, 1998; Maehr & Midgley, 1991). Observing the values of the arithmetic mean of each statement on the subscale, it is clear that teachers do this on average several times during the semester up to once a week to enable students to make sense of and fully understand the content they are learning and to apply knowledge and skills in new situations and different contexts.

Research and developmental nature of knowledge

The mean score on the Research and Developmental Nature of Knowledge subscale is lower than on the Connection and Application subscale. The result indicates that teachers encourage students to conduct research several times during the semester and emphasise the developmental nature of knowledge and its conditioning by the cultural and social context. The reason for the insufficient presentation of these activities in the classroom could be that teachers need to control the effectiveness of the teaching process, and for this reason, probably resort more often to frontal forms of teaching. The result is in line with the research by Markić (2014), which showed that the frontal form of teaching is the most common form of work, in contrast to working in pairs and groups.

Independence and involvement

The mean score on the Independence and Involvement subscale indicates that teachers encourage students to be independent, take control of their own learning, participate in the planning and delivery of lessons and select content several times during the semester. The result can be correlated with the research findings that indicate that the traditional teaching approach is still predominant (Carnell, 2005; Jurčić, 2012; Peko & Varga, 2014; Anđić & Vidas, 2021; Rašić, 2022; Gumartifa, Syahri, Rusdy, Nurrahmi & Norazmie, 2023) and that there is a need to promote students' independence and involvement in lesson planning, adaptation of subject curricula and didactic materials. Accordingly, in a number of countries such as the Netherlands, Germany and the United States of America, attention is being paid to the creation of new and the adaptation of existing teaching materials for CTL, especially in the field of natural sciences and mathematics (Genderen, 1989; Sutman & Bruce, 1992; Vos, Taconis, Jochems & Pilot, 2011; Sumarwoto, Degeng & Sukowiyono, 2019).

Differences in the implementation of CTL in the classroom

The analysis of arithmetic means has shown that female teachers are more likely than male teachers to link teaching content to existing knowledge and skills and to enable students to apply the acquired knowledge in new contexts and different situations.

Table 6
Frequency of implementation of CTL with respect to gender

	Gender	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
<i>Connection and Application</i>	Men	4.08	1.04	-2.881	.004
	Women	4.46	1.36		
<i>Research and Developmental Nature of Knowledge</i>	Men	3.73	1.12	-0.105	.916
	Women	3.74	1.15		
<i>Independence and Involvement</i>	Men	3.64	1.04	1.233	.219
	Women	3.48	1.22		

Note: *M* – mean, *SD* – standard deviation, *t* – t-value, *p* – p-value

As Table 6 illustrates, female teachers do this once a week, while male teachers carry out such activities somewhat less frequently. A statistically significant difference was found between the mean scores. Similar research results indicate a more pronounced pedagogical and social sensitivity of female teachers (Biklen, 1995; Kovačević, 2007), which is characteristic of modern forms of teaching activity. Female teachers are more likely to perceive teaching as a student-centred practice, in contrast to male teachers who tend to see teaching as direct transmission (OECD, 2018). Analysing the results on the Research and Developmental Nature of Knowledge subscale revealed that there is no difference in the frequency of implementation of this dimension of CTL in relation to gender. The results show that both male and female teachers encourage students to research equally frequently and emphasise the developmental nature of knowledge and its conditioning by the cultural and social context. The results on the Independence and Involvement subscale indicate that male teachers are somewhat more likely to allow the sharing of responsibility for students’ own learning, taking some control over teaching through involvement, independence in the choice of content, etc. However, no statistically significant differences were found. The results can be linked to the research of Lombaerts, Engels and Van Braak (2009) who found that the gender of the teacher has no significant influence on the promotion of students’ self-regulated learning. Student involvement and independence are key factors in promoting self-regulated learning, assuming responsibility for one’s own learning and motivation (Benware & Deci, 1984). The results obtained should be interpreted with caution due to the gender imbalance of the sample, in which women predominate.

Frequency of implementation of CTL with respect to age

Table 7

Frequency of implementation of CTL with respect to age

	Age	M	SD	F	p
<i>Connection and Application</i>	< 36	4.80	1.42	9.276	<.001
	37 – 50	4.14	1.20		
	> 51	4.51	1.31		
<i>Research and Developmental Nature of Knowledge</i>	< 36	3.82	1.27	1.103	.334
	37 – 50	3.66	1.07		
	> 51	3.83	1.16		
<i>Independence and Involvement</i>	< 36	3.58	1.12	0.548	.579
	37 – 50	3.48	1.00		
	> 51	3.60	1.04		

Note: M – mean, SD – standard deviation, F – F-statistic (value of ANOVA), p – p-value

The mean scores on the Connection and Application subscale show that teachers under the age of 36 are more likely to enable the connection of content to existing knowledge, skills and abilities, experiences from an authentic setting, and to promote the application of knowledge and skills in new situations and different contexts, compared to teachers aged 37 to 50. It is also evident that teachers under the age of 36 do this slightly more often than teachers over the age of 51. Statistically significant differences were found.

Table 8

Post hoc test for results on the Connection and Application subscale with respect to age

Age (1st group)	Age (2nd group)	ΔM	SE ΔM	p
< 36	37 – 50	0.67	0.16	<.001
	> 51	0.29	0.20	.291
37 – 50	> 51	-0.38	0.15	.042

Note: ΔM – delta M, SE ΔM – standard error of delta M, p – p-value

The Games-Howell post hoc test showed that teachers aged 37 to 50 were statistically significantly less likely than younger and older teachers to give students the opportunity to link and apply the knowledge they had acquired in new situations. It was found that there is no statistically significant difference in the assessment of the frequency of carrying out activities that allow students to connect and apply the acquired knowledge in new situations between teachers under 36 years of age and those over 51 years of age. The result can be correlated with the results of the survey conducted by Bay, Ilhan, Aydin, Kinay, Yiğit, Kahramanoğlu, Kuzu and Ozyurt (2014) on teachers' beliefs about the constructivist teaching approach. It was found that teachers with the fewest years of service, who are also younger, and older teachers with the most

years of service have a more favourable attitude towards the constructivist teaching approach compared to teachers with 6 to 10 years of service. The results of this study can be explained by the fact that younger teachers had the opportunity to familiarise themselves with the elements of CTL to a greater extent during their formal university education. The result for teachers over the age of 51 can be explained by their many years of professional experience, due to which they manage their classroom more efficiently, while the students have a higher degree of freedom to engage in the lesson planning, selection of content and independence.

Arithmetic mean values on the other two subscales show that all age groups carry out these activities several times during the semester. The result can be linked to a more systematic application of the curriculum approach and a stronger emphasis on student-centred teaching, which is most effectively realised through research, problem and project work. No statistically significant differences were found in the estimates. Analysing the arithmetic mean values on the Independence and Involvement subscale shows that both teachers younger than 36 and older than 51 encourage students to be independent and involved, while teachers aged 37 – 50 are less likely to do so. The analysis of variance did not reveal any statistically significant differences. The result can be explained by the richer teaching experience of older teachers in general, but also in terms of more efficient management of the class and teaching in the area of weak control, which allows students to be independent and participate in the planning of lessons and the selection of content. The younger teachers usually have less professional experience in teaching and have only relatively recently completed a university degree, adopting learning outcomes that follow the guidelines of the curricular approach and the implementation of student-centred teaching.

Frequency of implementation of CTL with respect to years of service

Differences in the frequency of lessons where teachers enable the connection and application of teaching content to real-life situations and different contexts can be explained by the greater experience of teachers with longer professional backgrounds. This is supported by studies showing that such teachers more often promote the development of students' metacognitive skills (Markić, 2014; Gazibara, 2018). Statistically significant differences were found by performing the analysis of variance.

The Games-Howell post hoc test revealed several statistically significant differences. First, teachers with 6 to 10 years of professional experience were less likely to link teaching content to real-life situations and different contexts and to enable application in new situations and different contexts than teachers with less than 5 years, 16 to 20 years, and more than 21 years of service. Next, it was found that teachers with 11 to 15 years of service reported lower assessments than those with less than 5 years and those with more than 21 years of service. The other differences between the groups were not statistically significant. The result can be partially linked to the study of teachers'

Table 9
Frequency of implementation of CTL with respect to years of service

Subscale	Years of service	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
<i>Connection and Application</i>	< 5	4.76	1.50	8.704	<.001
	6 – 10	3.82	1.08		
	11 – 15	4.16	1.15		
	16 – 20	4.39	1.14		
	> 21	4.76	1.41		
<i>Research and Developmental Nature of Knowledge</i>	< 5	3.76	1.20	0.675	.610
	6 – 10	3.58	1.05		
	11 – 15	3.72	1.17		
	16 – 20	3.76	1.08		
	> 21	3.86	1.21		
<i>Independence and Involvement</i>	< 5	3.49	1.12	1.167	.326
	6 – 10	3.44	0.90		
	11 – 15	3.40	0.99		
	16 – 20	3.65	1.06		
	> 21	3.67	1.08		

Note: *M* – mean, *SD* – standard deviation, *F* – *F*-statistic (value of ANOVA), *p* – *p*-value

beliefs about the socio-constructivist approach to teaching (Bay et al., 2014). It was found that teachers with fewer years of service tended to favour a socio-constructivist approach to teaching compared to teachers with longer professional experience. Younger teachers tend to have fewer years of service, so this result can be explained by the fact that they are teachers who have relatively recently completed higher education, adopting learning outcomes that follow the guidelines of the National Curriculum Framework (NCF), which emphasise the importance of connecting and applying teaching content to real-life situations. On the other hand, teachers with more than 21 years of experience were found to facilitate the linking of learning content and its application in real-life contexts once a week, based on students' previous experiences outside school. This is a relatively high frequency, which can be explained by their greater work experience, which allows them to connect the learning content to real life. The results on the Research and Developmental Nature of Knowledge subscale show that teachers encouraged students to conduct research several times during the semester, regardless of their years of service. The analysis of variance revealed no statistically significant differences in the assessments.

The mean scores on the Independence and Involvement subscale indicate that teachers with less than 5, 6 to 10, and 11 to 15 years of service estimate that they allow students to control their own learning, participate in lesson planning and select content independently once or twice during the semester. In addition, teachers with 16 to 20 years of service and those with more than 21 years of service do this several times during the semester. However, the results of the analysis of variance show that there is no statistically significant difference. There are noteworthy studies that have found that greater professional teaching experience has a positive impact on the use of CTL, and their results have shown that teachers with 21 to 30 years of service tend to implement CTL practices more frequently (Shamsid-Deen & Smith, 2006; Toledo & Valenzuela, 2015). Similar results were reported in a study that found that mathematics

teachers with less teaching experience were less likely to implement CTL practices in the classroom (Mahmud, Maat, Rosli, Sulaiman & Mohamed, 2022).

Table 10
Post hoc test for results on the Connection and Application subscale with respect to years of service

Years of service (1st group)	Years of service (2nd group)	ΔM	SE ΔM	<i>p</i>
< 5	5 – 10	0.94	0.20	<.001
	11 – 15	0.60	0.21	.036
	16 – 20	0.37	0.20	.365
	> 21	0.00	0.23	1
6 – 10	11 – 15	-0.34	0.17	.290
	16 – 20	-0.57	0.17	.007
	> 21	-0.94	0.20	<.001
11 – 15	16 – 20	-0.23	0.18	.684
	> 21	-0.60	0.20	.031
16 – 20	> 21	-0.36	0.20	.348

Note: ΔM – delta M, SE ΔM – standard error of delta M, *p* – *p*-value

Implementation of CTL with respect to teaching field

The mean scores on the Connection and Application subscale show that teachers of all teaching fields are equally likely to carry out activities that allow students to connect content to real-life situations and previous experiences, as well as to apply what they have learnt in new situations and different contexts several times during the semester.

According to the ANOVA results, no statistically significant differences were found in the assessments. The results on the Research and Developmental Nature of Knowledge subscale indicate that teachers in all teaching fields reported very similar assessments. The mean scores relating to the frequency of encouraging students to conduct research and the emphasis on the developmental nature of knowledge and its conditioning by the cultural and social context indicated insufficient implementation of such activities. The ANOVA results showed no statistically significant difference. The results of the assessment of the implementation of activities that enable students to be independent, control their own learning, participate in lesson planning, and be independent in the selection of content on the Independence and Involvement subscale, showed that, except for language and communication teaching field, teachers from all other fields estimate that they do this several times during the semester. The analysis of variance revealed no statistically significant differences in the assessment. Scarce studies have focussed on comparing the frequency of using active learning strategies in the classroom in different teaching fields (Crisol-Moya, Romero-López & Caurcel-Cara, 2020). Some of the more recent research assessing the frequency of implementation of student-centred teaching strategies does not focus on the educational field but on the teacher’s self-assessment of their understanding and appreciation of their teaching

field (Coggin, 2020). It has been shown that teachers who better understand and value their teaching field are more likely to use teaching strategies that promote research, project-based teaching and self-regulation of learning.

Table 11
Frequency of implementation of CTL with respect to teaching field

	Teaching field	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
<i>Connection and Application</i>	Natural Sciences and Mathematics	4.38	1.25	0.393	.758
	Language and Communication	4.27	1.39		
	Social Sciences and Humanities	4.45	1.34		
	Arts and Health	4.47	1.30		
<i>Research and Developmental Nature of Knowledge</i>	Natural Sciences and Mathematics	3.83	1.13	1.615	.187
	Language and Communication	3.58	1.14		
	Social Sciences and Humanities	3.88	1.24		
	Arts and Health	3.64	1.04		
<i>Independence and Involvement</i>	Natural Sciences and Mathematics	3.57	1.06	2.301	.079
	Language and Communication	3.36	0.99		
	Social Sciences and Humanities	3.52	1.11		
	Arts and Health	3.74	0.97		

Note: *M* – mean, *SD* – standard deviation, *F* – F-statistic (value of ANOVA), *p* – p-value

Limitations of this research

The results obtained should be observed with caution due to the non-uniform sample of respondents, particularly with regard to the gender variable. Future studies could include a more diverse population of respondents. Other elements of CTL, such as the assessment of authentic knowledge, could be included in the research. The use of qualitative methods, conducting research in focus groups, individual interviews, or quasi-experiments could enrich knowledge about CTL.

Conclusion

The study was based on the fundamental dimensions of CTL: Connection and Application, Research and Developmental Nature of Knowledge, Independence and Involvement, to determine the frequency of their implementation in classroom practice. In terms of results, the Connection and Application subscale showed that teachers provided opportunities to connect course content to real-world contexts and student experiences several times during the semester, up to once a week. The Research and Developmental Nature of Knowledge and Independence and

Involvement subscales showed that these dimensions are slightly less common on average. When assessing the presence of CTL elements, differences were found in relation to the socio-demographic characteristics of the respondents. With regard to gender, female teachers reported, with statistical significance, more opportunities to link lesson content, while no statistically significant differences were found in the assessment of the other two subscales. With regard to age, it was found that teachers aged 37 to 50 were less likely to link teaching content to real-life situations compared to younger and older teachers, which was statistically significant. In terms of years of teaching experience, it was found that teachers with 6 to 10 years of experience were statistically significantly less likely to be able to connect lesson content to real-life situations. It was also found that teachers with 11 to 15 years of experience were less likely to engage in such activities than teachers with the fewest and most years of experience, which was also statistically significant. The results of the assessment of the frequency of implementation of CTL elements related to the teaching field showed that all groups of teachers provided opportunities to connect teaching content to real-life situations several times during the semester. Further results on the Research and Developmental Nature of Knowledge and Independence and Involvement subscales show that, regardless of the teaching field, teachers believe that they encourage students to engage in research, independence, control of their own learning, involvement in planning, and emphasise the developmental nature of knowledge several times during the semester. The frequency of conducting such activities is somewhat lower for language and communication teachers, who do so once or twice during the semester.

Analysing the results obtained, it can be concluded that CTL is insufficiently implemented in the classroom, with a special focus on dimensions related to Research and Developmental Nature of Knowledge, Independence and Involvement.

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Sonja Kovačević

University of Split
Faculty of Humanities and Social Sciences
Poljička cesta 35, 21000 Split, Croatia
sonja@ffst.hr

Joško Barbir

University of Split
Faculty of Humanities and Social Sciences
Poljička cesta 35, 21000 Split, Croatia
jbarbir@ffst.hr

Učestalost provedbe elemenata kontekstualnoga učenja i poučavanja u predmetnoj nastavi

Sažetak

U radu su izneseni rezultati istraživanja učestalosti provedbe kontekstualnoga učenja i poučavanja iz perspektive nastavnika osnovnih škola, i to na osnovi triju temeljnih dimenzija: povezivanje i primjena, istraživanje i razvojna priroda znanja te uključivanje i samostalnost kao bitnih obilježja KUIP. Dobiveni rezultati istraživanja ukazali su kako učitelji procjenjuju da relativno rijetko u nastavi provode KUIP, a posebno kada je riječ o dimenzijama istraživanje i razvojna priroda znanja te uključivanje i samostalnost. Također su utvrđene i razlike s obzirom na ispitivane sociodemografske varijable.

Ključne riječi: *aktivno učenje, autentično okruženje, konstruktivizam, kurikulumski pristup*

Uvod

Kako bi se ispunila očekivanja života i rada u modernom društvu pojačava se interes za kvalitetno obrazovanje što zahtijeva promjene u nastavnom procesu. Timski rad, odgovornost za osobni razvoj i razvoj društva, suradnja te inovativnost i poduzetništvo, zahtjevi su postavljeni pred pojedinca i odgojno-obrazovne sustave. „Odgoj i obrazovanje za kvalitetan život u 21. stoljeću usmjeren je prema izgrađivanju kompetencija nužno različitih od onih dominantnih u prošlim vremenima, a temelji se na produktivnim općim i specifičnim znanjima kojima osoba uspješno operira te ih primjenjuje i izvan odgojno-obrazovnog konteksta“ (Vrkić Dimić, 2013, str. 49). Navedeno je ostvarivo ako učenici uvide smisao onoga što uče i mogu sadržaje povezivati s kontekstom osobnih, društvenih i kulturalnih okolnosti. Stoga se ne očekuje kako će se planirane promjene realizirati uz još uvijek dominantni razredno-predmetno-satni sustav i nastavu usmjerenu na učitelja i sadržaje, a manje na učenike (Cuban, 2007). Iz tog razloga sve češće se naglašavaju ideje i prakse kojima je u središte nastavnoga procesa učenik (O’Sullivan, 2004). Realizacija ovakvih nastavnih praksi podrazumijeva primjenu KUIP kojim se naglašava važnost smislenih aktivnosti. Takav nastavni pristup učenje sagledava kao aktivnost širu od usvajanja sadržaja i primjenu naučenoga u različitim kontekstima (Wirth i Perkins, 2008). Ovim istraživanjem dobiva se uvid u trenutačno stanje nastavne prakse i na posredan način spoznaja o potrebnim kompetencijskim, organizacijskim i materijalnim uvjetima kako bi se kvalitetnije unaprijedila nastava.

Rezultati istraživanja, osim što dijagnosticiraju stanje otvaraju i pitanja o sadržajima bazičnoga obrazovanja učitelja, stručnoga i profesionalnoga usavršavanja te pristupa izrade i realizacije kurikula. Dobiveni podatci mogu se iskoristiti za sagledavanje osobne prakse, i za razumijevanje KUIP-a te uvođenja promjena kojima bi ga implementirali u nastavu.

Kontekst i kontekstualni nastavni pristup

Pojam *kontekst* krajem 20. st. koristi se u humanističkim i društvenim znanostima da bi ga Verbitsky i Kalashnikov, (2012, str. 118) definirali kao psihološki kontekst „(...) sustav unutarnjih i vanjskih čimbenika i uvjeta ljudskoga ponašanja i djelovanja, koji mogu utjecati na percepciju, razumijevanje i transformaciju određene situacije, a koji određuju značenje i smisao situacije kao cjeline i njezine komponente“. Radi se o psihičkom mehanizmu kojim se stvara značenje i smisao. Oers (1998) kontekst interpretira kao mentalni okvir, kao situacija učenja i kao aktivnost, no bez obzira promatramo li ga kao statičnu situaciju ili kao različite interpretacije situacija, važno je da značenje proizlazi iz situacija koje imaju socijalni smisao te predstavljaju kontekst smislenoga učenja. Interpretacije konteksta, povezane su s pojedincem i njegovim djelovanjem u sociokulturnom okružju, „(...)...međutim, to nije nikakav mehanički ili tek logični odnos. Akcije se uvijek tumače kao više ili manje smislene realizacije neke aktivnosti, s obzirom na trenutačni cilj, motiv, dostupna sredstva i pravila koja treba slijediti“. U nastavi nije moguće odvajati navedene interpretacije već ih je potrebno sumativno uzeti u obzir prilikom učenja i poučavanja (Oers, 1998; Gorodetsky, Keiny, Barak, Weiss, 2003; Vrkić Dimić, 2011). S obzirom na to da se kontekst sagledava kao mentalni okvir, ali i kao konkretna situacija može se govoriti o povezanosti psihološkoga i nastavnoga konteksta jer je u nastavi od pedagoške važnosti spoznati na koji se način odvija proces učenja u smislu otkrivanja značenja i uvida u namjenu i svrhovitost sadržaja koji se uči. Pedagoški aspekt konteksta važan je za organizaciju nastavnoga okružja i sadržaja učenja (Purković, 2016). Didaktičkim aspektom konteksta određuje se smisao nastavnog asadržaja povezujući ga sa socijalnim interakcijama i situacijama učenja stvarajući pri tom poticajnu okolinu. S obzirom na rekurzivni karakter ljudske aktivnosti, novousvojene informacije konstruiraju se u kontekstu prethodnih psihičkih stanja i mogu se percipirati i tumačiti samo na temelju prethodnih iskustava (Zinchenko, 2001; Rubinstein, 2003) odnosno „Nijedna informacija ne postoji izvan konteksta“ (Verbitsky i Kalashnikov, 2012, str. 124). Ovakvo tumačenje konteksta ukazuje kako su kontekst i spoznaja nerazdvojni (Rogoff, 1990), a svaka spoznaja kontekstualno je ovisna (Tweney, 1998). Kako se znanja konstruiraju u trenutačnom razumijevanju situacije i fizičkom i društvenom interakcijom, nesumnjivo je da se kontekstualni nastavni pristup temelji na konstruktivizmu kao konstruiranje znanja kroz konkretne situacije i proživljeno iskustvo (Vrkić Dimić, 2011). Kontekstualni nastavni pristup objedinjuje učenje temeljeno na rješavanju problema, istraživačko i projektno učenje, suradničko učenje i autentičnu procjenu znanja. Cilj ovakvoga

pristupa jest povezivanje školskoga učenja i stvarnoga života (Schell i Schell, 2008). U skladu s navedenim proizlazi da su u izravnoj vezi razumijevanje načina o konstruiranju znanja i uloga učitelja u nastavnom procesu (Nespor, 1987). S obzirom da ne postoji „najbolji“ nastavni pristup ili nastavna strategija, na učitelju je da odabere one strategije koji učenicima omogućuju razumijevanje i primjenu znanja. Kao jedno od mogućih rješenja su strategije KUIP-a (Crawford, 2001) nastale kao rezultat istraživanja nastavne prakse utemeljene na KUIP-u, evaluacije uspješnosti nastave i iskustava učitelja (CORD, 1999; Navarra 2006; Ültay i Çalik, 2012). Naime, *Center for Occupational Research and Development* razvio je tzv. *REACT strategije* učenja koje su međusobno povezane i utemeljene na obilježjima KUIP-a (CORD, 1999; Crawford, 2001). Strategija *povezivanja (relating)* odnosi se na učenje u kontekstu životnoga iskustva te učenicima omogućuje povezivanje stečenih znanja s novim situacijama i različitim kontekstima (Johnson, 2002). *Strategija doživljavanja (experiencing)* potiče učenje istraživanjem, otkrivanjem i povezivanjem novih informacija s prethodnim ili novostečenim iskustvom. *Strategija primjene (applying)* podrazumjeva primjenu novih znanja u različitim kontekstima omogućujući aktivno sudjelovanje učenika u rješavanju problemskih situacija. *Strategija suradnje (cooperating)* implicira rad u malim skupinama, a odnosi se na učenje u kontekstu dijeljenja ideja i međusobnoga komuniciranja. *Strategija prijenosa (transferring)* temelji se na učeničkom predznanju te se odnosi na primjenu znanja i vještina u novim situacijama i kontekstima. Navedene strategije čine ključnu razliku među nastavnim pristupima jer kontekstualni nastavni pristup naglašava važnost razumijevanja sadržaja u odnosu na pamćenje činjenica jer se razumijevanjem sadržaja omogućuje prijenos u različite kontekste (Crawford, 2001). Ove strategije omogućuju učenje kroz učeničku aktivnost i iskustvo i mogućnost preuzimanja odgovornosti za vlastito učenje.

Uloga učitelja u kontekstualnom nastavnom pristupu

Uloga je učitelja poticati potrebu za kritičkim razmišljanjem, istraživanjem, i razvojem sposobnosti učenika za sagledavanje sadržaja u različitim kontekstima (Crawford, 2001; De Putter i Lesley, 2012). Sposobnost učitelja da nastavne sadržaje preoblikuje po principima KUIP-a naziva se upravljanje kontekstom (De Putter i Lesley, 2012), kojim se usmjeravaju nastavne aktivnosti ka povezivanju, prijenosu i primjeni sadržaja učenja. Učitelja se shvaća kao moderatora u procesu konstrukcije znanja predlažući učenicima metode učenja uz uključivanja učenika i njihovu samostalnost kako bi se ostvarila visoka razina samoregulacije učenja. Povezano s uključivanjem učenika, govori se o *kontinuum kontrole u nastavi* koji ukazuje na usmjerenost nastave a određen je s tri razine kontrole učitelja: *jaka kontrola, zajednička kontrola i slaba kontrola* (Vermunt i Verloop, 1999, u De Putter i Lesley, 2012). Uloga učitelja kao suradnika i moderatora realizira se u području slabe kontrole koja podrazumijeva usmjerenost nastave na učenika, samostalnost pri planiranju, procjenu vlastitoga postignuća, samoregulaciju, razvoj metakognitivnih vještina te upotrebu nastavnih

metoda i strategija koje omogućuju široke međusobne interakcije važne za intrinzičnu motivaciju, razumijevanje i primjenu sadržaja u različitim kontekstima (De Putter i Lesley, 2012; Gazibara, 2018; Purković, 2016; Johnson, 2002). Brojna su istraživanja ukazala kako učitelji doživljavaju teškoće pri prijelazu s nastave usmjerene na učitelja na nastavu usmjerenu na učenika (Hollingsworth, 1989; Neale, Smith, Neale i Johnson, 1990; Peterman, 1991; Bell i Pearson, 1991; Louden i Wallace, 1994; Stofflett i Stoddart, 1994) upravo iz razloga svojih početnih uvjerenja i perspektiva o ulozi učitelja, učenju i poučavanju (Wildy i Wallace, 1995).

Metodologija

Predmet istraživanja čini provedba KUIP-a u nastavi. Cilj je istraživanja ispitati:

- prema procjeni učitelja učestalost zastupljenosti elemenata KUIP-a u nastavi
- utvrditi razlike u samoprocjenama učitelja s obzirom na nezavisne varijable: dob, radni staž u nastavi i odgojno-obrazovno područje poučavanja.

Sukladno postavljenom cilju istraživanja formulirana su istraživačka pitanja:

1. Koliko su, prema procjeni učitelja, elementi KUIP-a zastupljeni u nastavi?
2. Postoje li razlike u procjeni zastupljenosti elemenata KUIP-a s obzirom na dob, radni staž u nastavi, predmetno područje poučavanja učitelja?

Uzorak istraživanja

U istraživanju je sudjelovao ukupno 421 učitelj predmetne nastave osnovnih škola u Republici Hrvatskoj. Prema kriteriju rada u predmetnoj nastavi na razini osnovne škole, raspodjela uzorka prikazana je u tablicama: 1 (spol), 2 (dob), 3 (predmetno područje poučavanja), 4 (godine radnoga staža).

Tablica 1

Tablica 2

Tablica 3

Tablica 4

Istraživački instrument

Istraživanje je provedeno anketnim upitnikom sastavljenim od dvaju dijelova: sociodemografski podatci i druge karakteristike (spol, dob, radni staž, predmetno područje); skala učestalosti provedbe KUIP-a u nastavi.

Skala učestalosti provedbe KUIP-a u nastavi konstruirana je polazeći od određenja KUIP-a kao procesa u kojem se spajanjem nastavnih sadržaja s kontekstom svakodnevnoga života omogućuje učenicima uvid u smisao sadržaja koji uče (Johnson, 2002). Neke od tvrdnji konstruirane su sadržajnom prilagodbom primjera iz literature koja se bavi istraživanjem konstruktivističkoga i kontekstualnoga okružja za učenje (Bošnjak, 2009; Matijević i Radovanović, 2011; De Putter i Lesley, 2012; Gazibara, 2018) te na

temelju razgovora s ekspertima čime se nastojala osigurati valjanost skale. Odabrane su tvrdnje za koje se smatralo da je pomoću njih moguće ispitati provedbu KUIP-a. Ista sadrži tri podskale. *Podskala povezivanje i primjena* sastoji se od 16 tvrdnji kojima se procjenjuje koliko često se nastavni sadržaji povezuju s postojećim znanjima, vještinama i sposobnostima, iskustvima učenika iz autentičnoga okružja. *Podskala istraživanje i razvojna priroda znanja* sastoji se od 7 tvrdnji kojima se procjenjuje koliko često učenici imaju mogućnost spoznati kako su nastavni sadržaji razvojne prirode i uvjetovani kulturnim i društvenim kontekstom te koliko učitelji potiču aktivno učenje. *Podskala samostalnost i uključivanje* sačinjena je od 5 tvrdnji kojima se ispituje koliko često učenici mogu preuzimati i dijeliti odgovornost za vlastito učenje i donositi odluke tijekom nastave.

Statističke metode

Odgovori na pitanja mjerena kategorijalnim mjernim ljestvicama prikazani su deskriptivno frekvencijama i postotnim udjelima. Numeričke varijable prikazane su aritmetičkim sredinama i standardnim devijacijama te frekvencijama i postotnim udjelima. Komponentna struktura korištenog ainstrumenata provjerena je analizom glavnih sastavnica. Od dobivenih komponenti uprosječivanjem odgovora na sva pitanja koja visoko zasićuju tu komponentu izrađeni su ukupni rezultati podskale povezivanje i primjena, potom podskale istraživanje i razvojna priroda znanja te podskale samostalnost i uključivanje. Teorijski raspon rezultata iznosi 1 do 7, a 7 iznosi najveću učestalost korištenja pristupa mjenoga skalom. Varijabla obrazovnih područja konstruirana je grupiranjem odgovora na pitanje o nastavnim predmetima koje sudionici poučavaju. Provedeni su testovi razlika s obzirom na dob, radni staž, obrazovno područje poučavanja. Te varijable tretirane su kao kategorijalne. Analizama varijance za nezavisne uzorke provjerilo se razlikuju li se učitelji različite dobi, radnoga staža, obrazovnoga područja poučavanja po rezultatima na skali dobivenih analizama glavnih sastavnica. Iako su pri primjeni t-testova i jednosmjernih analiza varijance distribucije pojedinih skupina odstupale od normalne, broj sudionika skupina dovoljno je velik da centralni granični teorem osigura normalnu distribuciju aritmetičkih sredina neovisno o distribuciji brutorezultata. Korištene su Welchove varijante testova koje korigiraju sva prisutna odstupanja od jednakosti varijanci. U slučaju Welchovih analizi varijance, korišteni su Games-Howell *post hoc* testovi koji također korigiraju odstupanja od jednakosti varijanci.

Računate su precizne („exact“) p-vrijednosti zbog čega nije potrebno brinuti o spajanju skupina kada su očekivane frekvencije manje od 5. U slučaju pronalaženja statistički značajnih razlika, izračunati su prilagođeni standardizirani reziduali kojima se utvrđuje statistička značajnost odstupanja svake ćelije od slučajne raspodjele odgovora. Korišteni su dvosmjerni testovi i alfa vrijednost od 5 %. Statistička obrada provedena je u programu R, verzija 3.6.3 (2019, R Core Team, Beč, Austrija) te u programu SPSS, verzija 26.0 (2018, IBM Corp., Armonk, N.Y., SAD). Moderacijske

analize provedene su PROCESS dodatkom SPSS-u. Prije provedbe faktorske analize utvrđeno je da su interkorelacije bile dovoljno visoke za provedbu eksploratornih analiza (Bartlettov $\chi^2 = 7862,17$, $p < ,001$). Postignuta je izvrsna Kaiser-Meyer-Olkinova mjera ($KMO = ,961$) te je utvrđeno da su podatci prikladni za faktorizaciju. Provedena je faktorska analiza glavnih sastavnica uz varimaks rotaciju, procjenu komunaliteta i Kaiser-Guttmanova kriterija te je ekstrahirano 3 faktora. Analizom sadržaja tvrdnji imenovani su faktori. Prvi faktor nazvan *povezivanje i primjena* objašnjava 46,37 % varijance, drugi faktor *istraživanje i razvojna priroda znanja* objašnjava 10,09 %, a treći *uključivanje i samostalnost* objašnjava 4,45 %. Trofaktorsko rješenje objašnjava ukupno 60,91 % varijance rezultata. Provedena je analiza pouzdanosti metodom unutarnje konzistencije te je izražena Cronbachovim alfa koeficijentom. Prvi faktor pokazuje visoku unutarnju konzistenciju 46,37 %, drugi 10,09 %, a treći faktor ima zadovoljavajuće visoku konzistenciju 4,45 %.

Rezultati i diskusija

Rezultati o učestalosti provođenja kontekstualnoga učenja i poučavanja u nastavi dobiveni su upotrebom Likertove skale, stupnjevane u rasponom od 1 – *nikad*, 2 – *jednom ili dva puta tijekom nastavne godine*, 3 – *jednom ili dva puta tijekom polugodišta*, 4 – *više puta tijekom polugodišta*, 5 – *jednom tjedno*, 6 – *više puta tjedno* i 7 – *svakodnevno*.

Analiza dobivenih rezultata provedena je na razini rezultata na podskalama i na razini tvrdnji svake podskale.

Tablica 5

Povezivanje i primjena

Iz visine aritmetičke sredine na podskali *povezivanje i primjena* vidljivo je da dvije trećine učitelja procjenjuju da više puta tijekom polugodišta nastavni sadržaji povezuju s postojećim znanjima, vještinama i sposobnostima učenika te da učenici imaju priliku primijeniti ih u novim situacijama i različitim kontekstima. Povezivanje sadržaja s realnim kontekstima jedna je od ključnih dimenzija KUIP-a kojom se omogućuje smisleno i potpuno razumijevanje sadržaja koji se uči (Shields, 1998). Rezultati ukazuju kako se povezivanje nastavnih sadržaja sa životnim kontekstima učestalije provodi u odnosu na ostale ispitivane dimenzije (*istraživanje i razvojna priroda znanja, samostalnost i uključivanje*). Rezultati istraživanja Karamatić, Luketić, Perin, (2022) ukazuju da učitelji i nastavnici u RH nekoliko puta tjedno planiraju aktivnosti polazeći od učenikovih prethodnih znanja, iskustava i interesa što je dijelom u skladu s rezultatima ovoga istraživanja. Istim istraživanjem utvrđeno je kako nastavnici procjenjuju da vrlo često obogaćuju nastavne sadržaje primjerima iz stvarnoga života i učenikova neposrednoga iskustva. Na to upućuju i rezultati TALIS istraživanja iz 2018. godine kojima je utvrđeno da se od svih nastavnih metoda hrvatski učitelji najčešće koriste problemima iz svakodnevnoga okruženja za ilustriranje korisnosti novoga znanja. KUIP karakterizira i povezivanje novonaučenih sadržaja s drugim

nastavnim sadržajima. Oko dvije trećine učitelja procjenjuju kako provode nastavu na kojoj potiču učenike na povezivanje različitih sadržaja. Nužno je i povezivanje nastavnih sadržaja s onim što su učenici prethodno učili na nastavi jer se primjena novostečenih znanja i vještina u novim situacijama temelji na učeničkom predznanju (Lent, Brown, Brenner, Chopra, Davis, Talleyrand, Suthakaran 2001). Rezultati pokazuju kako dvije trećine učitelja relativno često sadržaje objašnjavaju upotrebom analogija. Upotreba analogija pri objašnjavanju sadržaja od učenika zahtijeva složene misaone operacije poput analiziranja, sintetiziranja, apstrahiranja i generaliziranja kako bi mogli logički promišljati i riješiti nove probleme. S obzirom na to da upotreba analogija u nastavi zahtijeva raznolike oblike rada poput rješavanja problema, nastave bazirane na pitanjima, analizama, apstrakcijama, generalizacijama i sl. dobiveni rezultat može se objasniti time da se nastava najčešće kreće u tradicionalnim okvirima rada. Istraživanje je pokazalo da dvije trećine učitelja relativno često oblikuju nastavne sadržaje na način koji učenicima olakšava razumijevanje svijeta izvan škole. Ako je sadržaj oblikovan tako da u njemu učenici prepoznaju relevantne životne situacije veća je vjerojatnost da će biti motiviraniji za učenje (Gerlai, 1998) i primjenu istih u autentičnim situacijama. Kada je riječ o povezivanju sadržaja iz različitih nastavnih predmeta 48 % učitelja relativno često učenicima pruža navedenu mogućnost. S obzirom da svega 15 % učitelja ovakvu praksu provodi svakodnevno, odnosno tek 11 % njih više puta tjedno, ne može se govoriti o dostatnoj zastupljenosti prakse međupredmetnoga povezivanja. Naime, riječ je o interdisciplinarnom učenju prema kojem se aktivnosti organiziraju prema potrebama učenika (Jensen, 2003). Interdisciplinarnost u nastavi razvija samostalnost i omogućuje aktivno stjecanje znanja (Sicherl-Kafol, 2002) razvojem različitih strategija mišljenja i povezivanja (Marentič-Požarnik, 2008). Povezivanje nastavnih sadržaja omogućuje učenicima potpuno razumijevanje i shvaćanje smisla onoga što uče (Shields, 1998). Većina učitelja procjenjuje kako relativno često potiče učenike na promišljanje kako prepoznati određeni problem u autentičnim situacijama. Važnost učestalijega poticanja učenika na prepoznavanje određenoga problema u situacijama stvarnoga života proizlazi iz shvaćanja da povezivanje nastavnih sadržaja sa životom pozitivno utječe na motivaciju i interes učenika za sadržaje učenja (Gerlai, 1998). Gotovo 66 % učitelja procjenjuje kako relativno često učenicima pokazuju načine na koje će primijeniti naučeno u rješavanju problema iz svakodnevnice. Za efikasnu primjenu KUIP-a značajno je uvažavanje iskustva učenika kao preduvjeta za kognitivnu i emocionalnu uključenost u proces učenja, dekonstrukciju postojećih i konstrukciju novih znanja (Watkins, Carnell, Lodge, 2007; Jelavić, 2008; Cindrić, Miljković, Strugar, 2010; De Putter i Lesley, 2012). 68 % učitelja relativno često u nastavi polazi od prethodnih iskustava učenika koja su stekli izvan škole. Povezivanje nastavnih sadržaja s realnim kontekstima jedna je od ključnih dimenzija KUIP-a s obzirom na to da se učenje odvija socijalnom interakcijom i konstrukcijom osobnoga znanja kroz aktivnosti u sociokulturnom okružju (Oers, 1998; Shields, 1998; Maehr i

Midgley, 1991). Sagledavajući vrijednosti aritmetičkih sredina svake tvrdnje podskale, vidljivo je da u prosjeku učitelji to čine više puta tijekom polugodišta do jednom tjedno kako bi se učenicima omogućilo smisleno i potpuno razumijevanje sadržaja koji uče kao i primjenu znanja i vještina u novim situacijama i različitim kontekstima.

Istraživanje i razvojna priroda znanja

Na podskali *istraživanje i razvojna priroda znanja* prosječna vrijednost niža je u odnosu na podskalu *povezivanje i primjena*. Rezultat upućuje na to kako učitelji više puta tijekom polugodišta potiču učenike na istraživački rad te naglašavaju razvojnu prirodu znanja i njegovu uvjetovanost kulturno-društvenim kontekstom. Razlog za nedovoljnu zastupljenost navedenih aktivnosti u nastavi možda se može objasniti potrebom učitelja da kontroliraju učinkovitost nastavnoga procesa te iz toga razloga vjerojatno češće koriste frontalne oblike nastave. Rezultat je u skladu s istraživanjem Markić (2014) koje je pokazalo kako je frontalni oblik nastave, za razliku od rada u parovima i skupinama, najučestaliji oblik rada.

Samostalnost i uključivanje

Prosječna vrijednost na podskali *samostalnost i uključivanje* ukazuje da učitelji više puta tijekom polugodišta potiču učeničku samostalnost, preuzimanje kontrole nad vlastitim učenjem, uključenost u planiranje i realizaciju nastave, odabiranje sadržaja. Rezultat se može povezati s rezultatima istraživanja koji ukazuju na još uvijek dominantnu zastupljenost tradicionalnoga pristupa nastavi (Carnell, 2005; Jurčić, 2012; Peko i Varga, 2014; Anđić i Vidas, 2021; Rašić, 2022; Gumartifa, Syahri, Rusdy, Nurrahmi, Norazmie, 2023) te na potrebu poticanja samostalnosti i uključivanja učenika u planiranje nastave, prilagodbe predmetnih kurikula i didaktičkih materijala. U skladu s tim u nizu zemalja poput Nizozemske, Njemačke, Sjedinjenih Američkih Država, pridaje se pažnja kreiranju novih i prilagođavanju postojećih nastavnih materijala za KUIP, a posebno u prirodoslovno-matematičkom području (Genderen, 1989; Sutman i Bruce 1992; Vos, Taconis, Jochems, Pilot, 2011; Sumarwoto, Degeng, Sukowiyono, 2019).

Provjera razlika u provedbi KUIP-a u nastavi

Analizom aritmetičkih sredina utvrđeno je da učiteljice češće od učitelja povezuju nastavne sadržaje s postojećim znanjima i sposobnostima te omogućuju učenicima da stečena znanja primjenjuju u novim kontekstima i različitim situacijama.

Tablica 6

Iz Tablice 6 vidljivo je da učiteljice to čine jednom tjedno dok učitelji takve aktivnosti provode nešto rjeđe. Utvrđeno je postojanje statistički značajne razlike između prosječnih vrijednosti. Slični su i rezultati istraživanja koji upućuju na naglašeniju pedagošku i socijalnu osjetljivost učiteljica (Biklen, 1995; Kovačević, 2007) koja je svojstvena suvremenim oblicima nastavnoga rada. Učiteljice češće doživljavaju poučavanje kao praksu orijentiranu na učenike, za razliku od učitelja koji su skloniji

poučavanje doživljavati kao izravnu transmisiju (OECD, 2018). Analizirajući rezultate na podskali *istraživanje i razvojna priroda znanja*, utvrđeno je da ne postoji razlika u čestini provedbe navedene dimenzije KUIP-a s obzirom na spol. Rezultati pokazuju kako oba spola podjednako često potiču učenike na istraživački rad te naglasak stavljaju na razvojnu prirodu znanja i njegovu uvjetovanost kulturno-društvenim kontekstom. Rezultati na podskali *samostalnost i uključivanje*, ukazuju da učitelji nešto češće omogućuju podjelu odgovornosti za vlastito učenje, preuzimanje dijela kontrole nastave uključivanjem, samostalnost u odabiru sadržaja i sl. međutim nisu utvrđene statistički značajne razlike. Rezultati se mogu povezati s istraživanjem Lombaerts, Engels, Van Braak (2009) koji su utvrdili kako spol nastavnika nema značajan učinak na poticanje samoreguliranoga učenja učenika. Uključivanje i samostalnost učenika ključni su čimbenici poticanja samoreguliranoga učenja, odgovornosti za vlastito učenje i motivaciju (Benware i Deci, 1984). Dobivene je rezultate potrebno oprezno tumačiti zbog spolne nejednačenosti uzorka u kojem prevladavaju žene.

Učestalost provedbe KUIP-a s obzirom na dob

Tablica 7

Visine prosječnih vrijednosti na podskali *povezivanje i primjena* pokazuju da učitelji mlađi od 36 godina češće omogućuju povezivanje sadržaja s postojećim znanjima, vještinama i sposobnostima, iskustvima iz autentičnoga okružja te poticanja primjene znanja i vještina u novim situacijama i različitim kontekstima u odnosu na učitelje u dobi od 37 do 50 godina. Također je vidljivo kako učitelji mlađi od 36 godina to čine neznatno češće od nastavnika starijih od 51 godine. Utvrđene su statistički značajne razlike.

Tablica 8

Games-Howell *post hoc* testom utvrđeno je da učitelji dobi od 37 do 50 godina statistički značajno rjeđe u odnosu na mlađe i starije učitelje omogućuju učenicima da stečena znanja povezuju i primjenjuju u novim situacijama. Utvrđeno je kako nema statistički značajne razlike u procjeni učestalosti provedbe aktivnosti kojima se učenicima omogućuje da stečena znanja povezuju i primjenjuju u novim situacijama, između učitelja mlađih od 36 godina i starijih od 51 godina. Rezultat se može povezati s rezultatima istraživanja nastavnčkih uvjerenja o konstruktivističkom nastavnom pristupu koje su proveli Bay, Ilhan, Aydın, Kinay, Yiğit, Kahramanoğlu, Kuzu, Ozyurt (2014). Utvrđeno je da nastavnici s najmanje radnoga staža, a koji su ujedno i mlađi, kao i oni stariji s najviše radnoga staža iskazuju pozitivnija uvjerenja prema konstruktivističkom pristupu nastavi u odnosu na nastavnike sa 6 do 10 godina radnoga staža. Rezultate dobivene ovim istraživanjem moguće je objasniti time kako su mlađi učitelji tijekom formalnoga visokoškolskog obrazovanja u većoj mjeri imali priliku upoznati elemente KUIP-a. Rezultat za učitelje starije od 51 godina moguće je objasniti njihovim dugogodišnjim iskustvom rada zahvaljujući kome učinkovitije

upravljaju razredom, a učenici imaju veću slobodu uključivanja u planiranje nastave, odabiru sadržaja i samostalnost.

Visine aritmetičkih sredina na drugim dvjema podskalama pokazuju kako sve dobne skupine navedene aktivnosti provode više puta tijekom polugodišta. Rezultat je moguće povezati sa sustavnijom primjenom kurikulskog pristupa i većega naglasaka na nastavu usmjerenu na učenika koja se najučinkovitije realizira kroz istraživački, problemski i projektni rad. Nisu utvrđene statistički značajne razlike u procjenama. Analiza vrijednosti aritmetičkih sredina podskale *samostalnost i uključivanje*, pokazuje kako učitelji mlađi od 36 godina kao i oni stariji od 51 godina potiču učenike na samostalnost i uključivanje, dok učitelji u dobi od 36 do 50 godina to čine rjeđe. Analizom varijance nisu utvrđene statistički značajne razlike. Rezultat je moguće objasniti bogatijim iskustvom rada u nastavi starijih učitelja općenito pa tako i s obzirom na učinkovitije upravljanje razredom i nastavom u području tzv. slabe kontrole čime se učenicima omogućuje samostalnost i uključivanje u planiranje nastave i odabira sadržaja. Kada je riječ o mlađim učiteljima to su u pravilu učitelji s manje radnoga iskustva u nastavi koji su relativno nedavno završili visokoškolsko obrazovanje usvajajući ishode učenja koji su slijedili odrednice kurikulskog pristupa i provedbe nastave usmjerene na učenika.

Učestalost provedbe KUIP-a s obzirom na radni staž u nastavi

Razlike u učestalosti provedbe nastave na kojoj učitelji omogućuju povezivanje i primjenu nastavnih sadržaja s realnim životnim situacijama i različitim kontekstima mogu se objasniti većim iskustvom učitelja s dužim radnim stažem, a čemu u prilog idu i rezultati istraživanja koji su pokazali kako učitelji s duljim radnim stažem u većoj mjeri potiču razvoj metakognitivnih vještina učenika (Markić, 2014; Gazibara, 2018). Provedbom analize varijance utvrđene su statistički značajne razlike.

Tablica 9

Games-Howell *post hoc* testom utvrđeno je kako učitelji s 5 do 10 godina radnoga staža statistički značajno rjeđe povezuju nastavne sadržaje s realnim situacijama i različitim kontekstima te omogućuju primjenu u novim situacijama i različitim kontekstima u odnosu na one s manje od 5 godina, sa 16 do 20 te one s više od 21 godine radnoga staža. Utvrđeno je da učitelji s 11 do 15 godina radnoga staža iskazuju statistički značajno niže procjene od onih s manje od 5 godina te one s više od 21 godina radnog staža. Preostale razlike među skupinama nisu statistički značajne. Rezultat se može djelomično povezati s istraživanjem učiteljskih i nastavničkih uvjerenja o sociokonstruktivističkom pristupu nastavi (Bay i sur., 2014). Utvrđeno je kako su nastavnici s manje godina radnoga staža skloniji sociokonstruktivističkom nastavnom pristupu u odnosu na nastavnike s duljim radnim stažem. U pravilu mlađi učitelji imaju i manje radnoga staža, stoga se ovaj rezultat može objasniti kako je riječ o učiteljima koji su relativno nedavno završili visokoškolsko obrazovanje usvajajući ishode učenja koji su slijedili odrednice NOK-a u kojima se naglašava važnost povezivanja i primjene nastavnih

sadržaja s realnim životnim situacijama. S druge strane, utvrđeno je da učitelji s više od 21 godine staža jednom tjedno omogućuju povezivanje sadržaja učenja i njihovu primjenu u kontekstima stvarnoga života polazeći od prethodnih iskustava učenika koja su stekli izvan škole. Radi se o relativno visokoj učestalosti koja se može objasniti njihovim većim iskustvom rada koje im omogućava povezivanje sadržaja učenja sa stvarnim životom. Rezultati na podskali *istraživanje i razvojna priroda znanja* pokazuju da bez obzira na duljinu radnoga staža učitelji više puta tijekom polugodišta potiču učenike na istraživački rad. Provedbom analize varijance nisu utvrđene statistički značajne razlike u procjenama.

Tablica 10

Prosječne procjene dobivene na podskali *samostalnost i uključivanje* pokazuju kako učitelji s manje od 5, 6 do 10 te s 11 do 15 godina staža procjenjuju kako jednom ili dva puta tijekom polugodišta omogućuju učenicima kontrolu vlastitoga učenja, uključenost u planiranje nastave te samostalni odabir sadržaja. Nadalje, učitelji s 16 do 20 i s više od 21 godine staža to čine više puta tijekom polugodišta. Međutim, rezultati analize varijance pokazuju kako nema statistički značajne razlike. Značajna su istraživanja kojima je utvrđeno da veće radno iskustvo učitelja povoljno utječe na primjenu KUIP-a, a rezultati su pokazali kako su učitelji s 21 do 30 godina iskustva skloniji učestalijem korištenju praksi KUIP-a (Shamsid-Deen i Smith, 2006; Toledo i Valenzuela, 2015). Slični su nalazi dobiveni u studiji u kojoj je utvrđeno da se učitelji matematike s manje nastavnoga iskustva u manjoj mjeri koriste praksama KUIP-a u nastavi (Mahmud, Maat, Rosli, Sulaiman, Mohamed, , 2022).

Provedba KUIP-a s obzirom na odgojno-obrazovno područje

Iz dobivenih prosječnih vrijednosti na podskali *povezivanje i primjena* vidljivo je da učitelji svih odgojno-obrazovnih područja podjednako učestalo provode aktivnosti kojima omogućuju učenicima da povezuju sadržaje s realnim situacijama i prethodnim iskustvom kao i primjenu naučenoga u novim situacijama i različitim kontekstima, a to čine više puta tijekom polugodišta.

Tablica 11

Prema rezultatima ANOVE nisu utvrđene statistički značajne razlike u procjenama. Rezultati na podskali *istraživanje i razvojna priroda znanja* ukazuju da učitelji svih odgojno-obrazovnih područja iskazuju vrlo slične procjene. Vrijednosti aritmetičkih sredina koje se odnose na procjene učestalosti poticanja učenika na istraživački rad te stavljanje naglaska na razvojnu prirodu znanja i njegovu uvjetovanost kulturno-društvenim kontekstom ukazuju na nedostatno provođenje takvih aktivnosti. Prema rezultatima ANOVE ne postoji statistički značajna razlika. Rezultati procjene provedbe aktivnosti kojima se omogućuje učenicima samostalnost, kontrolu vlastitoga učenja, uključenost u planiranje nastave, samostalnost u odabiru sadržaja i sl. na podskali *samostalnost i uključivanje* pokazuju da, izuzev jezično-komunikacijskoga odgojno-

obrazovnoga područja, učitelji iz svih drugih područja procjenjuju da to čine više puta tijekom polugodišta. Analizom varijance nisu utvrđene statistički značajne razlike u procjeni. Rijetka su istraživanja usmjerena na usporedbu učestalosti provedbe strategija aktivnoga učenja u nastavi u različitim odgojno-obrazovnim područjima poučavanja (Crisol-Moya, Romero-López, Caurcel-Cara, 2020). Neka od recentnih istraživanja procjene učestalosti provedbe nastavnih strategija usmjerenih na učenika ne fokusiraju se na odgojno-obrazovno područje već na učiteljsku samoprocjenu razumijevanja i uvažavanja svojega predmetnog područja (Coggin, 2020). Utvrđeno je kako se učitelji koji bolje razumiju i u većoj mjeri uvažavaju svoje predmetno područje koriste nastavnim strategijama kojima potiču istraživački rad, projektnu nastavu i samoregulaciju učenja.

Ograničenja ovog istraživanja

Dobivene rezultate potrebno je sagledavati s oprezom zbog neujednačenoga uzorka ispitanika posebno s obzirom na varijablu spol. Buduća istraživanja mogu obuhvatiti raznovrsniju populaciju ispitanika. U istraživanje se mogu uključiti i drugi elementi KUIP-a poput autentične procjene znanja. Upotrebom kvalitativne metodologije, provedbom istraživanja na fokus-grupama, individualnih intervjua ili kvazieksperimenata mogle bi se obogatiti spoznaje o KUIP-u.

Zaključak

U istraživanju se pošlo od temeljnih dimenzija KUIP-a: *Povezivanje i primjena, istraživanje i razvojna priroda znanja, uključivanje i samostalnost* kako bi se utvrdila učestalost provedbe istih u nastavnoj praksi. Dobiveni rezultati na podskali *povezivanje i primjena* pokazali su kako nastavnici procjenjuju da *više puta tijekom polugodišta do jednom tjedno* pružaju prilike za povezivanje nastavnih sadržaja s realnim životnim kontekstima i iskustvima učenika. Rezultati na podskali *Istraživanje i razvojna priroda znanja i uključivanje i samostalnost* ukazuju da su ove dimenzije u prosjeku nešto rjeđe zastupljene. Utvrđene su razlike u procjeni zastupljenosti elemenata KUIP-a s obzirom na sociodemografska obilježja ispitanika. S obzirom na *spol*, nastavnice statistički značajno češće pružaju prilike za povezivanje nastavnih sadržaja dok na ostalim dvjema podskalama nisu utvrđene statistički značajne razlike u procjenama. Kada je riječ o dobi, utvrđeno je da učitelji u dobi od 37 do 50 godina statistički značajno rjeđe omogućuju povezivanje nastavnih sadržaja sa stvarnim životnim situacijama u odnosu na mlađe i starije nastavnike. S obzirom na duljinu radnoga staža u nastavi, utvrđeno je kako nastavnici sa 6 do 10 godina staža statistički značajno rjeđe, omogućuju povezivanje nastavnih sadržaja sa stvarnim životnim situacijama. Također je utvrđeno da nastavnici s 11 do 15 godina radnoga staža statistički značajno rjeđe provode takve aktivnosti u usporedbi s nastavnicima s najmanje i najviše radnoga staža. Rezultati procjene učestalosti provedbe elemenata KUIP-a s obzirom na odgojno-obrazovna područja poučavanja pokazali su da sve skupine nastavnika

više puta tijekom polugodišta omogućuju povezivanje nastavnih sadržaja sa stvarnim životnim situacijama. Ostali rezultati na podskalama *istraživanje i razvojna priroda znanja* te *uključivanje i samostalnost* pokazuju da bez obzira na odgojno-obrazovno područje poučavanja, procjenjuju kako *više puta tijekom polugodišta* potiču učenike na istraživački rad, samostalnost, kontrolu vlastitoga učenja, uključenost u planiranje, samostalnost te stavljanju naglaska na razvojnu prirodu znanja. Nešto je rjeđa učestalost provedbe takvih aktivnosti zabilježena kod nastavnika iz jezično-komunikacijskoga područja koji to čine *jednom ili dva puta tijekom polugodišta*.

Analizom dobivenih rezultata može se zaključiti da se KUIP nedostatan provodi u nastavi s posebnim naglaskom na dimenzije koje se odnose na istraživanje i razvojnu prirodu znanja te samostalnost i uključivanje.