TEACHING SOCIAL SCIENCES IN ECE: EXPLORING CORRELATIONS WITH CREATIVITY AND ALGORITHMIC THINKING

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Abstract Teaching social sciences in early childhood education context is demanding and little research has been done related to competences that support the high-quality teaching in social studies. The purpose of this study is to examine specific concepts to better understand possible implications of these concepts in teaching social sciences in early childhood education. Future teachers, students of preschool education (N=31), reported the highest mean values for teamwork, following social sciences teaching skills, creative self-assessment, and algorithmic thinking teaching skills. Students feel most competent in teaching life skills and slightly less competent in teaching social studies, presumably of its complexity. The analysis of correlations between all four concepts revealed that students who report higher creativity, report higher teamwork skills and higher algorithmic thinking teaching skills. The results are important for supporting the students in creativity during their undergraduate study and in learning how to teach social sciences in early childhood education.

Keywords:
social sciences, early childhood education, algorithmic thinking, teamwork, creativity

University of Maribor Press
DOI https://doi.org/10.18690/um.pef.2.2023.4
ISBN 978-961-286-707-2

1 Introduction

1.1 Why is teaching of social sciences in ECE important

Teaching in ECE (early childhood education) should be in an open and playful classroom setting, designed to be child-centred and nurturing (Madrid and Dunn-Kenney, 2010), especially when teachers prepare activities related with social sciences, because the themes can be sometimes abstract, difficult to understand or complex (Wallace, 2017). We understand the teaching of social sciences as the part of kindergarten curriculum concerned with the study of social relationships and the functioning of society (Odihambo, Nelson and Chrisman, 2016; Wallace, 2017). The knowledge and skills learned through social sciences prepare children to become informed and engaged citizens of their country and the world (Ingleby and Oliver, 2010). Social sciences in ECE, is a field designed to meet the educational needs of society. It emerged at the beginning of the 20th century as a holistic approach to citizenship education using the techniques of social science, raising questions, gathering data, analysing, discussing etc. (Mindes, 2005).

Including social sciences in the educational curriculum of the early childhood years provides an opportunity for ECE teachers to support children as they are developing a sense of self and an awareness of their family and community (Seefeldt, Castle and Falconer, 2014). Preschool programs in Slovenia have a formal social studies curriculum and many everyday preschool experiences provide a foundation for learning social studies (Curriculum for Kindergartens, 1999).

Teaching of social sciences in ECE is important, as each child is a member of society and depends on the functioning of the society in which he or she lives, so it is necessary to introduce children to the basic knowledge of society, its mechanisms, characteristics, services and systems from the pre-school period onwards (Seefeldt et al., 2014). At the same time, children are becoming aware that there are other members of these communities who make contributions to their own well-being and that of the other community members. ECE teachers can lead them in studies of topics within their community, including businesses, community services, jobs and responsibilities of adults, history, geography, economy, social and emotional skills, values, health education, thorough daily routine, introducing to social environment, visiting various institutions, learning about occupations, health, traffic, media etc.

Teaching and learning of social sciences enable children to develop the intellectual habits of investigation and inquiry as they learn how to transform their curiosity into questions and then represent what they have learned using developing skills in language, fine arts, and play (Licardo, 2017). By incorporating social sciences in the early years, teachers are establishing the foundation for a democracy. They help preschool children to develop group participation skills, such as social negotiation and problem solving, communicating about one's needs, and making decisions as a group. Experiences in social studies provide a foundation for the skills needed to become an active, aware and productive citizen (Mindes, 2005).

1.2 The process of teaching and learning social sciences in ECE

Teaching social sciences in ECE should include systematic approach to solve open-ended problems, development of communication skills, social and emotional skills, multicultural understanding, collaboration skills and teamwork.

It is important that instructional design in ECE implement step by step approach where children recognize basic steps, fine-tune them and interconnect them into basic cognitive concepts in learning social sciences. Learning of social sciences is dependent on meaning-making. Meaning is related to cognitive concepts made or constructed by the individual child, that is acting in a social environment and using available resources (Kress, 2010). Learning is also social process whereby knowledge in constructed during social communication and sign-making activities (Selander, 2008, Kress and van Leeuwen, 2001, van Leeuwen, 2005). Significant to teaching and learning are institutional settings, learning resources, instructional designs and teachers' creativity during those processes.

For teaching social sciences in ECE various methods and strategies can be used, which all implies that ECE teachers should be creative when preparing an instructional design. For example, if ECE teachers apply experiential learning, it is necessary that teacher enables children to observe, experience, manipulate with objects and processes, to offer the children multiple resources for learning, to discuss with the children about their prior knowledge and to lead them to be able to connect prior knowledge to new knowledge, while learn through experience. All this cannot be done without teachers' creativity (Budihal et al., 2020). If ECE teachers apply problem-based learning, focus should be on how to develop cognitive skills, critical

thinking, argumentation, creative thinking, innovation and intuition. Problems should be meaningful, real, with possible multiple answers and solutions and teachers should be able to lead the children to find or propose meaningful problems for exploring and learning (Zhang et al., 2011). Again, teachers need creativity and besides, they also need to be able to recognize and define specific steps to lead the problem-based learning process. The role of the teacher in problem-based learning is to facilitate children's knowledge construction through analysing and solving problems. Teachers' creativity and step by step guidance can support that problem solving process or experience learning process leads to learning. Experience itself does not necessarily lead to learning. It is not uncommon that teachers use fun activities that successfully entertain children, but do not lead to learning (Gelman and Brenneman, 2004). Possible misconception of teaching social sciences is also teacher-centred instructional strategies over more active and child-centred strategies, and instead of improving critical thinking they are just teaching facts (Lucey et al., 2014). Such mis-educative experiences can constrain children to learn and develop (Dewey, 1935).

1.3 Why is algorithmic thinking and creativity important in teaching social sciences in ECE

Algorithmic thinking is derived from the idea of an algorithm, which is the process of figuring out a series of actions to execute in order to solve a problem and get the intended result (Katai, 2014). Algorithmic thinking definitions are still in the evolving process and can't be generalizable yet (Berland and Wilensky, 2015). In ECE we understand that algorithmic thinking includes logical thinking, evaluation, decomposition, abstraction, generalization to analyze the problem, process or phenomenon. It is important that ECE teachers can recognize algorithms in everyday learning processes and to be able to implement algorithmic thinking in learning situations (Gencel et al., 2021). For example, when children learn how to wash their hands or teeth, we can teach them simple algorithms related to step-by-step actions in those basic skills. It is crucial that teacher can recognize and define the sequence of steps (algorithms) and to present them to children in a playful, creative way and support them to master the specific skill. Another example could be that teacher creates a board game with traffic rules and children apply one of the possible coding tools, e. g. robots like Cubetto, MTiny or BeeBot, to move the robot with coding and complete specific tasks given by the teacher or by the children. In

such learning process children analyse which steps are important to complete the task, they learn to decompose complex steps into smaller ones, evaluate if they reached the desired goal and learn about traffic signs and other rules they need to consider in this specific traffic situation in a playful way.

Creativity in teaching ECE is also of very important, because it enables teacher to create learning environment, create learning tools, visual material, play and to innovate learning experience in everyday practice. By definition (Runco and Jaeger, 2021), creativity includes innovation and effectiveness, we may also add a possibility to applicate the creation in educational process with the purpose to achieve learning goals. Teachers therefore should be creative in the ways they conceive and carry out their role and, in the ways, they develop learning opportunities, and relationships with the children and other stakeholders in the learning process. In the last few decades creativity is perceived central to education, to be applied to education to respond to key challenges in a way it has never been before (Craft, 2005). Some authors (Seltzer and Bentley, 1999) argue that we live in the creative age where we should shift the focus away from what we should know and onto what we should be able to do with our knowledge. The "know how" is the central to developing creative ability of the teacher.

Teaching social sciences in ECE is a complex task and little research has been done related to competences that support the high-quality teaching in social studies in ECE context (Lucey et al., 2014). The purpose of this study is to examine the above-mentioned perceived concepts and skills of future ECE teachers (students of preschool education), to better understand the correlations and possible implications of these concepts in professional development in teaching social sciences in ECE.

2 Method

2.1 Participants and procedure

Participants in the study were 31 students of second year study full time program Preschool Education at University of Maribor, Faculty of Education, who were participating in the seminar on algorithmic thinking in social sciences during the winter semester 2021/22 on 6 lectures and sessions with total number of 18 hours of the seminar. The seminar was conducted during the Erasmus+ project Algolittle

(Algolittle, 2022), where students were learning how to teach social sciences with algorithmic thinking skills and play-based learning. Majority (n = 28; 90,3%) of the students were 21 years old, two of them were 22 and one was 23 years old, most (n = 30) of them were females, one student was male. Their average grade was 8,37 (SD = 0,55), 12 students of 31 (38,7%) were students of first generation, which means that they were the first members of their extended family, who were studying at the university. Informed consent was obtained from the students regarding the collection, analysis and publication of the data and results of the research study.

We collected the data in the beginning and at the end of the seminar. It this research we present part of the analysis which includes only the data collected at the end of the seminar with special focus on correlations between social sciences teaching skills and other concepts (e. g. algorithmic teaching skills, creativity and teamwork).

2.2 The instruments

In this study we used four instruments, two of them were made for the purpose of this study and two were validated instruments from other authors.

To measure social sciences teaching skills we created short instrument for students' self-assessment. We used 3 self-assessment questions related to teaching of social sciences in ECE (Assess your knowledge and skills for preparation of guided activities that include algorithmic thinking for a) life skills, b) health education and c) social studies in ECE). Five item scale was used (1- nonsufficient, 2 – sufficient, 3 – good, 4 – very good, 5 – excellent). We computed the three questions in one variable Teaching social sciences skills. The instrument shows good reliability, Cronbach alpha value is 0,92.

To measure algorithmic thinking skills in teaching we made the instrument for the purpose of this study. The instrument was created by the team of experts in the project Erasmus+ Algolittle. The questionnaire includes 9 variables related to teaching knowledge and skills of algorithmic thinking on five-item scale (1- no knowledge, 2 – sufficient knowledge, 3 – good knowledge, 4 – very good knowledge, 5 – excellent knowledge). For example, I can explain algorithmic thinking and its features, I can give examples of algorithmic thinking in daily life, I can develop appropriate methods and strategies to teach algorithmic thinking skills, I know what

coding tools are used to develop algorithmic thinking skills in early childhood education. The instrument shows good reliability, Cronbach alpha value is 0,88.

To measure creativity, we used validated instrument the Short Scale of Creative Self – SSCS (Karwowski, 2011), which measures creative self-efficacy and creative personal identity. The SSCS is composed of 11 items, of which 6 measure creative self-efficacy and 5 measure creative personal identity. Creative self-efficacy is composed of the following variables (3) I know I can efficiently solve even complicated problems, (4) I trust my creative abilities, (5) My imagination and ingenuity distinguishes me from my friends, (6) Many times I have proved that I can cope with difficult situations, (8) I am sure I can deal with problems requiring creative thinking, (9) I am good at proposing original solutions to problems. Creative personal identity is composed of the variables (1) I think I am a creative person, (2) My creativity is important for who I am, (7) Being a creative person is important to me, (10) Creativity is an important part of myself, (11) Ingenuity is a characteristic that is important to me. It is a self-assessment instrument measured on 5-point Likert scale with values 1 – definitely not, 2 – somewhat not, 3 – neither yes or no, 4 – somewhat yes and 5 – definitely yes. The internal consistency of both scales is high: α CSE = .81, α CPI = .90. In validation research both scales had bee characterized by high reliablity and validity (Karwowski, 2012). A two factor structure of the instrument was confirmed by confirmatory factor analysis and exploratory structural equation modelling (Karwowski, 2011a, 2012; Karwowski et al., 2013). We calculated a creative self-concept score by averaging all 11 items, as suggested by author of the instrument (Karwowski, 2011).

To measure teamwork, validated instrument Teamwork scale for youth was used (Lower et al., 2015). It is a self-assessment scale developed to assess a youths' perceived ability to collaborate and work with others to achieve a common goal in the group or team context (Anderson-Butcher et al., 2014). Items 1 and 2 reflect attitudes toward teamwork, Items 3–10 reflect teamwork behaviours. Items are assessed on a 5-point Likert-type scale ranging from 1 (not at all true) to 5 (really true). These items possess a degree of content validity, given the nature of teamwork, which involves group engagement, communication, and working as a team. Confirmatory factor analyses examined the factor structure and measurement invariance of the scale across time. Teamwork Scale for Youth demonstrate acceptable factorial validity and measurement invariance across time. Additionally,

strong reliability and concurrent and predictive validity of the scale are established (Lower et al., 2015).

2.3 Analysis

We analysed the data in SPSS, using descriptive statistics for sum scales (min, max, mean and standard deviation, frequencies) and inferential statistics for correlations between scales and individual variables. We also calculated the reliability value with Cronbach alpha coefficient for each scale.

3 Results

3.1 Descriptive statistics

Table 1: Descriptive statistics for sum scales

Scales	N	Min	Max	M	SD
Social science teaching skills	31	3,00	5,00	4,20	0,63
Creative self	31	2,73	5,00	3,99	0,55
Teamwork	31	3,40	5,00	4,41	0,49
Algorithmic thinking teaching skills	31	3,00	5,00	3,91	0,48

Results for sum scales indicate that after the seminar students report the highest mean values for teamwork, following social sciences teaching skills, creative self-assessment and algorithmic thinking teaching skills. We can observe that the mean values for all scales are quite high and the minimum and maximum values proof that all measured values are above the 2,5 which is considered as middle value. Additionally, we checked for frequency distribution and mean values for each item for social sciences teaching skills, because the purpose of the seminar was to improve those skills of the students.

Table 2: Descriptive statistics for teaching social science skills

Variables	N	scale	f	f %	M	SD
Teaching life skills	30	good	3	10,0	4,26	0,63
		very good	16	53,3		
		excellent	11	36,7		
Teaching health education skills	30	good	4	13,3	4,20	0,66
		very good	16	53,3		
		excellent	10	33,3		
Teaching social studies skills	30	good	6	20,0	4,13	0,73
		very good	14	46,7		
		excellent	10	33,3		

3.2 Correlations

Table 3: Correlations between measures and CA coefficients

	1	2	3	4
1 Social science teaching skills	(,91)			
2 Creative self	,25	(,88)		
3 Teamwork	,21	,52**	(,90)	
4Algorithmic thinking teaching skills	,20	,39*	,10	(,88)

*p<.05, **p<.01

The results in the table show statistically significant strong positive correlation between teamwork and creative self-concept (r = .52, p = 0.003) and moderate positive correlation between teamwork and algorithmic thinking teaching skills (r = .39, p = 0,04), which indicates that those students who are creative might show good teamwork and might have more potential to develop algorithmic thinking teaching skills. Correlations between social science teaching skills and measured variables are positive, weak, and not significant.

Cronbach alpha values show good reliability on all included measures (<.70).

We wanted to know more about the positive significant correlations, so we did further analysis of correlations between individual items of the teamwork, creativity and algorithmic thinking teaching skills.

The results of correlations between individual variables od Creative self and Algorithmic thinking teaching skills show mostly positive correlations. The most significant correlations occur in variables of Creative self-efficacy and practical knowledge and skills in algorithmic thinking teaching.

Strong positive correlations are between My imagination and ingenuity distinguish me from my friends and I can create algorithmic thinking activities in different learning areas of ECE (r = ,57; p = 0,001) and Many times I have proved that I can cope with difficult situations and I can develop appropriate methods and strategies to teach algorithmic thinking skills (r = ,54; p = 0,002), I know what coding tools are used to develop algorithmic thinking skills in early childhood education (r = ,57; p = 0,001). Moderate positive correlations are between Many times, I have proved that I can cope with difficult situations and I can explain algorithmic thinking and

its features (r = ,37; p = 0,039), I know how to benefit from algorithmic thinking in different learning areas of early childhood education (r = ,47; p = 0,008), I can create algorithmic thinking activities in different learning areas of early childhood education (r = ,49; p = 0,012).

Table 4: Correlations between individual variables of Creative self and Algorithmic thinking teaching skills

Algorithmic thinking teaching skills / Creative self	I can explain algorithmic thinking and its features.	I know the types and characteristics of algorithmic thinking.	I can give examples of algorithmic thinking in daily life.	I can explain the benefits of algorithmic thinking skills in early childhood.	I can develop appropriate methods and strategies to teach algorithmic thinking skills.	I know what coding tools are used to develop algorithmic thinking skills in early childhood education.	I know how to benefit from algorithmic thinking in different learning areas of early childhood education.	I can create algorithmic thinking activities in different learning areas of early childhood education.	I believe that developing algorithmic thinking skills is important for teacher candidates.
I think I am a creative person.	0,01	-0,17	0,09	-0,02	0,01	0,07	0,16	0,07	-0,21
My creativity is important for who I am.	0,00	-0,31	0,12	0,08	0,09	0,17	0,24	0,20	-0,33
I know I can efficiently solve even complicated problems.	0,27	0,20	0,20	0,28	0,31	0,29	0,15	0,07	0,12
I trust my creative abilities.	0,28	0,08	0,21	0,12	0,16	0,06	0,19	0,13	-0,34
My imagination and ingenuity distinguish me from my friends.	,37*	0,02	0,34	0,17	0,32	0,20	0,31	,57**	0,19
Many times, I have proved that I can cope with difficult situations.	,49**	0,24	0,28	0,28	,54**	,57**	,47**	,49*	0,23
Being a creative person is important to me.	0,19	-0,22	0,21	0,13	0,16	0,24	,40*	0,34	-0,07

Algorithmic thinking teaching skills / Creative self	I can explain algorithmic thinking and its features.	I know the types and characteristics of algorithmic thinking.	I can give examples of algorithmic thinking in daily life.	I can explain the benefits of algorithmic thinking skills in early childhood.	I can develop appropriate methods and strategies to teach algorithmic thinking skills.	I know what coding tools are used to develop algorithmic thinking skills in early childhood education.	I know how to benefit from algorithmic thinking in different learning areas of early childhood education.	I can create algorithmic thinking activities in different learning areas of early childhood education.	I believe that developing algorithmic thinking skills is important for teacher candidates.
I am sure I can deal with problems requiring creative thinking.	,39*	0,26	0,21	0,30	,38*	0,30	0,25	,36*	0,03
I am good at proposing original solutions to problems.	0,30	0,20	0,01	-0,02	-0,01	0,15	-0,01	0,26	0,17
Creativity is an important part of myself.	0,10	-0,03	0,12	0,16	0,12	0,07	0,27	0,19	-0,32
Ingenuity is a characteristic that is important to me.	,37*	0,27	,51**	,37*	,51**	,50**	,60**	0,27	0,08

*p<.05, **p<.01

Another item of creative self-efficacy which indicates moderate positive correlations with algorithmic thinking teaching skills is I am sure I can deal with problems requiring creative thinking, which correlates with I can explain algorithmic thinking and its features (r = ,39; p = 0,029), I can develop appropriate methods and strategies to teach algorithmic thinking skills (r = ,38; p = 0,034) and I can create algorithmic thinking activities in different learning areas of early childhood education (r = ,36; p = 0,045).

Table 5: Correlations between individual variables of Creative self and Teamwork

Teamwor / Creative self	I think that teamwork is important.	People who work in teams can learn more than if they work by themselves.	I feel confident in my ability to work in a team.	I know how to give my team members feedback that will not hurt their feelings.	I ask others for feedback.	I make an effort to include other members of my group.	I value the contributions of my team members.	I treat my team members as equal members of the team.	I am good at communicating with my team members.	I feel confident in my ability to be a leader.
I think I am a creative person.	,46**	,39*	,39*	,12	,40*	,31	,13	,25	,16	,16
My creativity is important for who I am.	,53**	,44*	,27	-,01	,38*	,35	,22	,36*	,14	,08
I know I can efficiently solve even complicated problems.	,07	-,10	-,09	,08	,23	,49**	,30	,34	-,03	,08
I trust my creative abilities.	,54**	,50**	,47**	,17	,32	,37*	,15	,42*	,20	,29
My imagination and ingenuity distinguish me from my friends.	,24	,33	,53**	,28	,13	,20	,15	,29	,15	,39*
Many times, I have proved that I can cope with difficult situations.	-,26	-,16	-,16	-,18	,02	,22	,19	,17	-,23	,16
Being a creative person is important to me.	,37*	,35	,19	,08	,19	,45*	,31	,41*	,12	,11
I am sure I can deal with problems requiring creative thinking.	,22	,31	,21	,11	,41*	,52**	,38*	,54**	0,10	0,15

Teamwor / Creative self	I think that teamwork is important.	People who work in teams can learn more than if they work by themselves.	I feel confident in my ability to work in a team.	I know how to give my team members feedback that will not hurt their feelings.	I ask others for feedback.	I make an effort to include other members of my group.	I value the contributions of my team members.	I treat my team members as equal members of the team.	I am good at communicating with my team members.	I feel confident in my ability to be a leader.
I am good at proposing original solutions to problems.	,34	,25	,34	,34	,21	,36*	,32	,50**	,28	,45*
Creativity is an important part of myself.	,56**	,50**	,48**	,37*	,45*	,52**	,32	,54**	,29	,26
Ingenuity is a characteristic that is important to me.	,33	,37*	,31	,21	,37*	,53**	,18	,40*	,18	,17

The strongest positive correlations for Creative personal identity are between variable Ingenuity is a characteristic that is important to me and I can explain algorithmic thinking and its features (r = ,37; p = 0,043), I can give examples of algorithmic thinking in daily life (r = ,51; p = 0,004), I can explain the benefits of algorithmic thinking skills in early childhood (r = ,37; p = 0,040), I can give examples of algorithmic thinking in daily life (r = ,51; p = 0,004), I can explain the benefits of algorithmic thinking skills in early childhood (r = ,37; p = 0,034), I can develop appropriate methods and strategies to teach algorithmic thinking skills (r = ,51; p = 0,004), I know what coding tools are used to develop algorithmic thinking skills in early childhood education (r = ,50; p = 0,004) and the strongest positive correlation, I know how to benefit from algorithmic thinking in different learning areas of early childhood education (r = ,60; p = 0,000).

The results in the table show that variables of Creative personal identity more often significantly correlate with Teamwork than variables of Creative self-efficacy. In both cases correlations are positive and mostly moderate and, in some cases, strong.

Variable for Creative personal identity I Think I am a creative person moderately correlates with almost half of the variables of Teamwork: I think that teamwork is important (r = ,46; p = 0,009), People who work in teams can learn more than if they work by themselves (r = ,39; p = 0,033), I feel confident in my ability to work in a team (r = ,39; p = 0,030), I ask others for feedback (r = ,40; p = 0,027).

Similarly, variable My creativity is important to who I am, show strong positive correlation with: I think that teamwork is important (r = ,53; p = 0,002) and moderate positive correlation with People who work in teams can learn more than if they work by themselves (r = ,44; p = 0,014), I ask others for feedback (r = ,38; p = 0,034), I treat my team members as equal members of the team (r = ,36; p = 0,049).

Next variable for Creative personal identity, Being a creative person is important to me, shows moderate positive correlations with I think that teamwork is important (r = ,37; p = 0,040), I make an effort to include other members of my group (r = ,45; p = 0,011), I treat my team members as equal members of the team (r = ,41; p = 0,021).

Two last variables for Creative personal identity show strong and moderate positive correlations with majority of variables of Teamwork. Variable Creativity is an important part of myself correlates with I think that teamwork is important (r = ,56; p = 0,001), People who work in teams can learn more than if they work by themselves (r = ,50; p = 0,004), I feel confident in my ability to work in a team (r = ,48; p = 0,007), I know how to give my team members feedback that will not hurt their feelings (r = ,37; p = 0,041), I ask others for feedback (r = ,45; p = 0,011), I make an effort to include other members of my group (r = ,52; p = 0,003), I treat my team members as equal members of the team (r = ,54; p = 0,002). Variable Ingenuity is a characteristic that is important to me correlates with I think that teamwork is important (r = ,33; p = 0,055), People who work in teams can learn more than if they work by themselves (r = ,37; p = 0,042), I ask others for feedback (r = ,37; p = 0,040), I make an effort to include other members of my group (r = ,53; p = 0,002), I treat my team members as equal members of the team (r = ,40; p = 0,024).

Variables for Creative self-efficacy also indicate moderate and strong positive correlations with Teamwork variables. Variable I know I can efficiently solve even complicated problems moderately correlates with I make an effort to include other members of my group (r = ,49; p = 0,005).

Variable with the most significant correlations with Teamwork of creative self-efficacy variables is I trust my creative abilities. This variable correlates with I think that teamwork is important (r = ,54; p = 0,002), People who work in teams can learn more than if they work by themselves (r = ,50; p = 0,004), I feel confident in my ability to work in a team (r = ,47; p = 0,008), I make an effort to include other members of my group (r = ,37; p = 0,041), I treat my team members as equal members of the team (r = ,42; p = 0,018).

Variable My imagination and ingenuity distinguish me from my friends correlates with I feel confident in my ability to work in a team (r = ,53; p = 0,002) and I feel confident in my ability to be a leader (r = ,39; p = 0,032).

Variable I am sure I can deal with problems requiring creative thinking significantly correlates with I ask others for feedback (r = ,41; p = 0,023), I make an effort to include other members of my group (r = ,52; p = 0,003), I value the contributions of my team members (r = ,38; p = 0,034), I treat my team members as equal members of the team (r = ,54; p = 0,002).

Variable I am good at proposing original solutions to problems correlates with I make an effort to include other members of my group (r = ,36; p = 0,048), I treat my team members as equal members of the team (r = ,50; p = 0,005), I feel confident in my ability to be a leader (r = ,45; p = 0,011).

4 Discussion

In this research we examined the teaching of social sciences in the ECE context. The research is important because of the gap in understanding the high-quality teaching of social sciences and what competences of the teachers or future teachers (in our sample students of preschool education) are supportive in this context (Evans, 2021). By teaching social sciences in ECE, teachers develop many skills and competences of children, such as ability to investigate, teamwork, problem solving,

communication, social and emotional skills, multicultural understanding, cognitive skills in meaning-making of new concepts etc. For teaching social sciences many strategies and methods can be used and most of them include important skills like algorithmic thinking, creativity and teamwork which found the basis for teaching.

To better understand possible implications of algorithmic thinking, creativity and teamwork in professional development in teaching social sciences in ECE, we analysed the perceived skills of students after they finished seminar of algorithmic thinking in ECE, conducted during the Erasmus + project Algolittle (Algolittle, 2022). Students reported high mean levels on all analysed variables. The highest mean values are reported for teamwork, following social sciences teaching skills, creative self-assessment and algorithmic thinking teaching skills. In further analysis of skills in teaching social sciences students feel most competent in teaching life skills and slightly lower in teaching social studies. We presume it is because the themes of social sciences are more broad, complex, and it is not easy to explain or demonstrate these themes to children in ECE (Lucey et al., 2014; Evans, 2021). One reason is the complexity of specific themes, and second reason is that some themes are abstract, not concrete. Children in ECE might have challenges with understanding of abstract themes (e. g. what is mourning, death, honesty, prejudices or love) and teacher might have challenges to explain such abstract themes, while teaching life skills is very concrete and can be decomposed in simple tasks or steps. However, it is important to understand all sides in the pedagogical process and carefully plan the instructional design of the classroom activities which have learning objectives related to these themes (Lucey et al., 2014).

The analysis of correlations between all four concepts revealed that the strongest significant correlation occurred between teamwork and creative self-concept and moderate positive correlation between teamwork and algorithmic thinking teaching skills, which indicates that those students who are creative, might show good teamwork and might have more potential to develop algorithmic thinking teaching skills. To better understand observed significant correlations, we focused on creativity and analysed correlations between individual items of creativity vs. algorithmic thinking skills and creativity vs. teamwork. The most significant correlations occur in variables of Creative self-efficacy and practical knowledge and skills in algorithmic thinking teaching. Especially strong correlations are shown for students who report success in coping with problems or difficult situations and

algorithmic thinking skills. Besides, those who perceive themselves as ingenuine, report higher algorithmic skills. Regarding correlations between creativity and teamwork, results are more dispersed. Most of the items of creativity have four to five significant positive correlations with items for algorithmic thinking. The strongest correlations and with the highest number of items (7) which correlate with teamwork, is the notion that the creativity is important part of the teachers' skills. Which indicates that those future teachers who perceive themselves as creative are also good in teamwork.

From this research we can conclude that educational development for future teachers should involve themes and lessons that would support students in the development of creativity, especially creative self-efficacy, because this is one of the basic competences needed in their teaching of young children social sciences. The research also indicates that further research should be done in exploring possibilities how to support future teachers in high-quality teaching of social sciences in ECE context.

Acknowledgments

The collection of the data for the manuscript was conducted during the seminar of the Erasmus+ project Algolittle KA203, 2020-1-TR01-KA203-092333, EU in winter semester 2021 at University of Maribor, Faculty of Education.

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