

ORIGINAL RESEARCH ARTICLE

The impact of innovative learning environments on social competences of youth

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The exponential development of learning environments supported by information and communication technology (ICT), coupled with new insights from the fields of cognitive and neuroscience and artificial intelligence (AI), is a huge challenge for both the educational system and youths and their social competences. This article defines the impact of an effective use of contemporary education technologies on young people's engagement and their interest in collaborating with their peers and teachers on the level of interpersonal relationships. It investigates the teachers' and parents' perspective on youth and their cooperation when using ICT in the pedagogical process. The study confirms that innovative didactic approaches to teaching, supported by ICT, exert a positive influence on the collaboration between students, as well as between students and their teachers, and that youths, teachers and parents are all equally aware of that. Parents and teachers have a unified position in support of the idea that an effective use of ICT makes a positive contribution to collaboration between students, and thereby directly affects an increase in their social competences. ICT is becoming one of the important variables that affect the development of young people's social competences. The 2-year study was conducted in the framework of a national project.

Keywords: education system; ICT; psychosocial influence; social competences

Introduction

One of the problems of contemporary society is that the educational system must be able to train youths for life, equipping them with not only knowledge and different skills, but in particular teaching them how to confront everyday challenges and problems, and, in turn, how to resolve them. Young people have to develop not only their cognitive competences, but also cooperativeness and social competences because these are one of the basic conditions for life-long learning and improved employability. To achieve this, flexible forms of learning have to be implemented (Aberšek 2018).

The characteristics of today's generations, defined from different perspectives (sociological, technological, psychological, philosophical), and their expectations, are a new challenge for modern-day schools. The educational process must be more closely related to the individual's needs, their personal development and the cultural environment in which they live. The complexity of all the things affecting the youth of today (the environment, technology, a large amount of immediately accessible information,

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the possibility of direct communication with the entire world, newest insights from the fields of cognitive and neuroscience, artificial intelligence [AI], etc.) requires a well thought-out and quicker response on behalf of the creators of school policies than it did in the past (OECD 2016), mainly because the social environment in which we live (society, technology, etc.) is changing very rapidly, and because the school of today must prepare students for occupations and social environments, which at this moment don't even exist yet. All these changes in the social environment, in turn, require different, innovative ways of learning and teaching, to which the entire school system must be able to adapt on a paradigmatic level. We have to realise that we will not be able to achieve such great changes in the time we have by taking small steps. In the proposed learning and teaching strategy, special attention should be given to increasing the level of interest and motivation in youth.

Research shows that students, who are exposed to innovative didactic information and communication technology (ICT)-supported teaching methods, express a less depreciative attitude towards school (Carrió-Pastor and Skorczynska 2015; Flogie and Aberšek 2017; OECD 2011). Social interaction is integral to the healthy psychosocial development of adolescents. 'Because healthy development during early adolescence is complex and fraught with both challenges and opportunities, both parents and schools may need to conscientiously educate early adolescents about the potential risks the problematic or maladaptive engagement with specific ICT tools or applications can bring about in their lives' (Shaljan and Myint 2017).

The use of innovative ICT by youths in the context of social competence should be given special attention because it plays an important role in the process of socialisation (Li and Kirkup 2007). Such a model of didactical framework of incorporating social competences in innovative learning environment is schematically shown in the Figure 1.

Main research questions and hypothesis

Main research questions are as follows: How can we increase the students' social skills, their social awareness, their emotional intelligence and their social competences when we introduce individualisation, personalisation and differentiation in teaching/learning process? And also, can we increase social competences by using ICT?

Our main hypothesis is that with the use of innovative learning environment and appropriate teaching/learning strategies we can increase also students' social skills.

Review of the phenomenon under research

Many authors point out the positive influence of innovative learning environments on students' cognitive achievements. Howard-Jones, Pickering, and Diack (2007), Aberšek (2013), Aberšek and Dolenc (2015) and McNaughton *et al.* (2018) have proven the positive impact of using learning environments supported by ICTs and intelligent tutoring systems (see Figure 2) on the development of creative thinking, critical thinking and problem-solving. According to Bloom (1956) and Anderson and Krathwohl (2001), these are called high cognitive levels and are also in accordance with the Bloom's Digital Taxonomy (Churches 2008). According to the pedagogical doctrine, this is a consequence of the individualisation, personalisation and differentiation offered by intelligent learning environments. The positive influence of innovative learning environments on students' cognitive achievement is not an unexpected result.

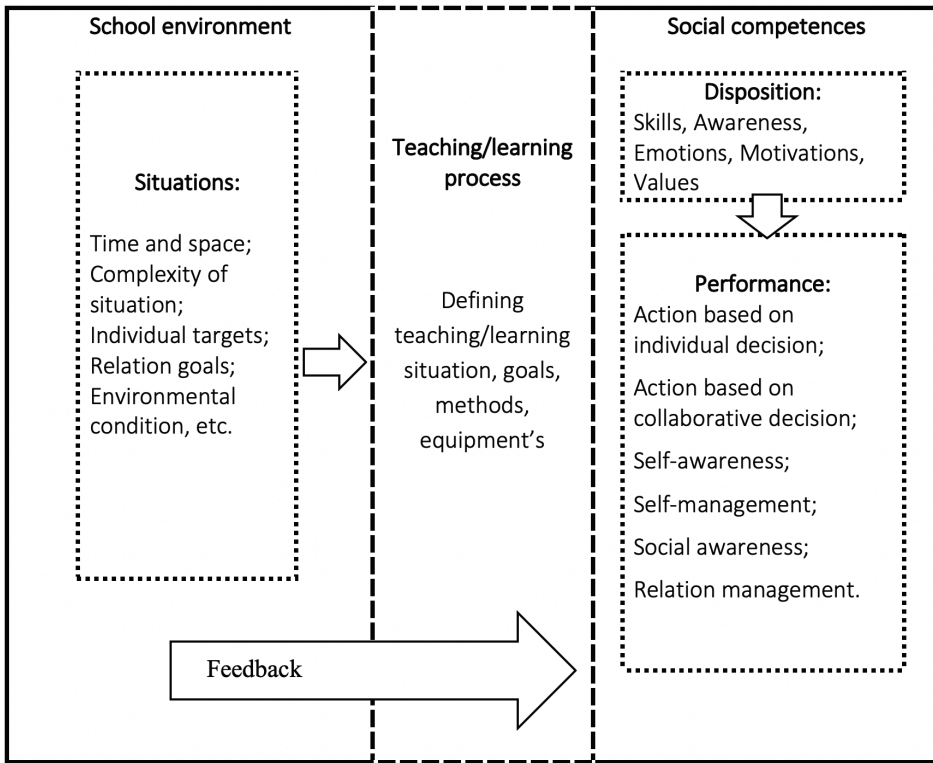


Figure 1. Model of didactical framework to enhance social competences in ITS.

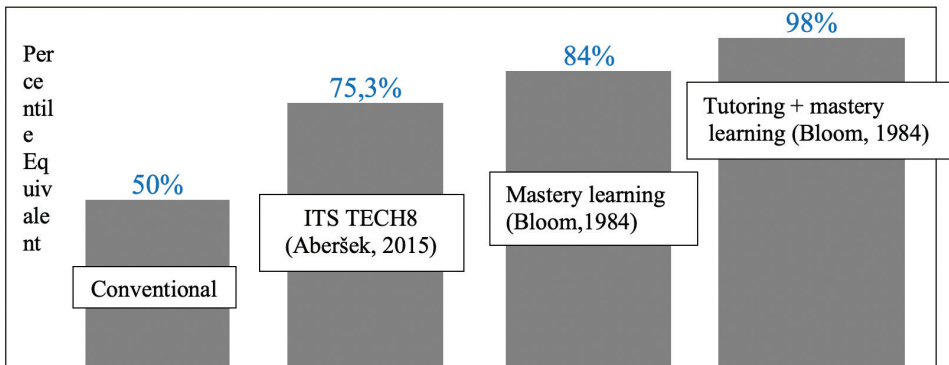


Figure 2. Achievement distribution for students under different learning conditions.

Such results on the side of students' cognitive improvement are remarkable. But at the same time a new and a very relevant question arises: What happens with the students' social skills, their social awareness, their emotional intelligence and their social competences? And also, can we increase social competences by using ICT?

Human beings are definitely social beings, which means that their social competences are equally, if not more, important than their cognitive skills. When speaking about social competences, emotional intelligence (EI) and emotional competences, it

can easily be observed that a lot of research has been carried out in this area; however, such studies were mostly focused on people with special needs. Studies in the field of autism are extremely important because this disorder is manifested by deficits in social-emotional reciprocity. This deficit greatly hinders children with autism spectrum disorder (ASD) from responding appropriately and adapting themselves in various social situations. Although evidence has shown that virtual reality environment is a promising tool for emotional and social adaptation skills training on ASD population, there is a lack of large-scale trials with intensive evaluations to support such findings (Ip *et al.* 2018). Research in the field of schizophrenia points out impairments in self-assessment, which are common in people with schizophrenia. Impairments in self-assessment of cognitive ability have been found to predict impaired functional outcome. One of the studies examined self-assessment of social cognitive ability and related it to assessments of social cognition provided by informants, to performance on tests of social cognition and to everyday outcomes. The difference between self-reported social cognition and informant ratings was used to predict everyday functioning (Hajdúk *et al.* 2018; Silberstein *et al.* 2018). Social competences are also emphasised in various non-traditional learning approaches, such as, for example, the Montessori pedagogy (Miranda, Marzano, and Lytras 2017). Many studies limit their focus only on particular problems related to social competences and emotional competences. Lin and Kao (2018) studied the use of EEG data in E-learning contexts; Khalfallah and Ben HadjSlama (2015) analysed facial expression recognition; Schroeder *et al.* (2018) focused on the influence of learners' perceptions of virtual humans on learning transfer and Bohlouli *et al.* (2017) were concerned with competence assessment as an expert system for human resource management, using a mathematical approach. McNaughton *et al.* (2018) developed a conditional augmentation hypothesis, which reviews theoretical rationales for and, where available, research evidence about the impact of digital tools and technologies on the development of these skills under two conditions. One is where there are direct effects of access to and use of digital technologies relatively independently from other influences of the teacher.

An entirely different situation can be observed in education that takes place in mainstream schools, where in the implementation of innovative learning environments studies are generally not focused on the social and emotional competences, but rather emphasise the cognitive component of the learning process. U.S. Department of Education, Office of Educational Research and Improvement (1996) many years ago made massive Assessment of Social Competence, Adaptive Behaviors, and Approaches to Learning with Young Children. They report that children's affect, particularly anxiety, regarding school, has been associated with attention to task, intrinsic motivation and achievement, and also affects teacher reactions and support of the student. They conclude that children's social competence is strongly influenced by their family, which is their first socialisation experience.

Kühn (2017) investigates the enhancement of social competence for disadvantaged young people based on the example of the 'Werkshule Bremen' educational course. The results show that a basic didactical concept is feasible, while the teaching and learning environment has a huge impact on the comparability. As a core result, this study delivers a didactic model that is based on target-controlled experience-oriented learning environments on the practical side and the social information processing approach on the theoretical side. Also, Hing Keung Ma (2013) point out that social competence has a Positive Youth Development Construct. Honeychurch and Patrick (2018) describe a participatory online culture – CLMOOC – and ask how its

ethos of reciprocity and creative playfulness occurs and suggest that Gee’s concept of an affinity space is an appropriate model for Massive Open Online Courses, and ask how this might be replicated in a higher education setting.

From our own research (Aberšek 2018; Aberšek, Borstner, and Bregant 2014; Aberšek and Dolenc 2015) as well as from the research conducted by many other researchers (Bano *et al.* 2018; Brevik, Gunnulfsen, and Renzulli 2018; Kaneko, Kishita, and Umeda 2018; Kim and Baylor 2006; Van Lehn 2011; Wong, Vuong, and Liu 2017), it is obvious that with intensive individualisation and differentiation of the teaching/learning process (one-on-one tutoring) and introducing intelligent (smart) learning environment, a drastic decrease in social skills (social competence) of the whole student population has been observed, which means the level of social skills and awareness (in comparison to traditional schools) is moved towards lower social competences. In the analysis of self-awareness and social awareness (part of social competences), this research also took into account the guidelines of the Trait Emotional Intelligence Questionnaire TEIQ-SF (Petrides 2009), that is, the guidelines for its short form (Katz and McClellan 1997; Petrides *et al.* 2010).

This research focuses mainly on self-awareness and social awareness as part of EI (see Figure 3). Social competence and/or social skills are used here as general terms defining the complex social interactions in society.

Social competences

The quality and added value of an individuals’ competences, skills and knowledge are the foundation for creating a competitive advantage in the globalised world and, in turn, the well-being of individual societies. On a global level, increasing demographic changes are reflected in the decrease of social and economic resources and consequently in the weakening of family ties.

The term *competence* refers to much more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on and mobilising psychosocial resources (including skills and attitudes) in a particular context.

In *Key Competences for Lifelong Learning*, the European Reference Framework sets out eight key competences, among them digital literacy and social and civic competences. The key competences are all considered equally important because each of them can contribute to a successful life in a knowledge society (CEU 2007, 2018).

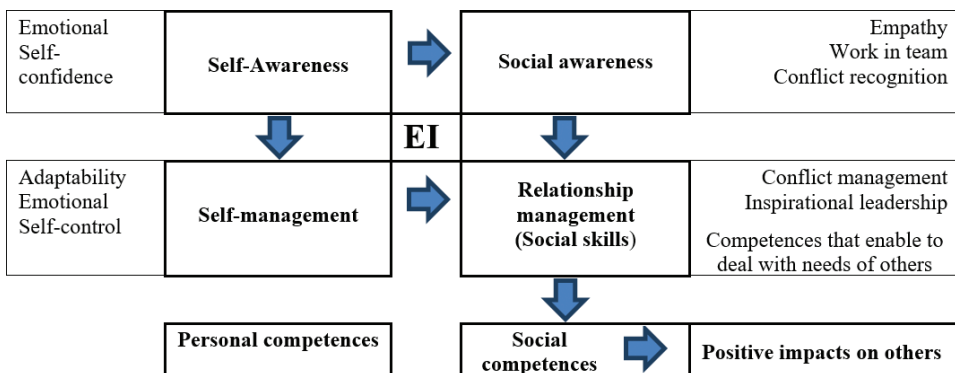


Figure 3. Emotional intelligence (EI) and social competences.

Social competence refers to a series of interpersonal abilities and characteristics that have an integral effect on the individual. We are hereby referring mainly to a sense of self-worth, that is, self-confidence, self-discipline and responsibility. Adler defines social competences as a form of self-management skills – skills that enable us to live in harmony with ourselves and the environment. Primarily this refers to maintaining a positive relationship with oneself, and consequently to interactions with other people. Social competence in an individual, thus, refers to a healthy dose of self-worth and self-confidence, a sense of personal responsibility and self-discipline. In interpersonal relationships, this is expressed as attention and empathy, that is, the capacity to place oneself in another's position, the ability to make compromises but also enter into conflicts, the idea of getting to know people, the ability to criticise, respect and tolerate, and the ability to express all of this verbally (i.e. linguistic competence) (Adler 2012). Social competences are thus interpreted as interactions between an individual and other people. The concept of social competence is directly linked to the idea of EI, which is shown schematically in Figure 1 (Aberšek 2018; Goleman 2006).

Social competences and EI are those skills and methods that the individual uses to successfully fulfil his or her own needs within a social environment, depending on different life situations, with the purpose of achieving personal growth and progress, and of being able to empathise and share one's emotions with others. These are skills that enable a person to live a quality life, in harmony with oneself and the surroundings. They refer to the way an individual responds and cooperates in interpersonal relationships, which occurs at three levels (Rozman 2006; van der Stouwe *et al.* 2018):

- at a personal level (building one's self-image, solving one's own problems, expressing ideas);
- at the level of relationships (negotiation, cooperation, making compromises, networking); and
- at the level of society (macrosystem) as a whole (sensitivity towards others, contributing to the general well-being of society).

Social competence and the school environment

If we consider social competences from the perspective of education and school, we can say that – just like learning anything else – the ability for a successful management of social skills requires for the basic physical and emotional needs of young people to be fulfilled. Social interactions are an integral part of a young person's healthy psychosocial development (Areepattamannil and Myinte 2017). As these needs cannot be met fully in the home environment, that is, the family, part of this responsibility is being increasingly shifted to the school environment. One of the tasks of school, therefore, is to fill in this social gap, without which a young person cannot be as successful as he or she could otherwise be (Koplow 2002). During the years of primary and secondary education, young people focus more on school and less and less on family; friends are becoming more and more important for their socialisation. Emotional regulation and sociability are another two key elements that are important during a young person's growing up. We can say that these are two important dynamic variables of every individual, which significantly affect their ability to maintain friendships, while social skills and the ability of realising and searching for common activities are important for maintaining friendships (Semrud-Clikeman 2007). In this kind of socialisation process, the role of modern ICT, e-services and e-contents

is a challenging one (mainly from the point of view of modern social networks and the networks of friends within these networks). But is the e-social network really as important as the real one? It is an interesting finding that even as early as in the pre-school period, the use of contemporary technology does not have a negative impact, as it was initially expected. Indeed, there are no statistically significant correlations between preschool children's engagement in ICT usage and their social competence; however, what can be perceived is a link between the evaluation of the child's social competence (by parents and educators) and their understanding of negative social situations (Proekt *et al.* 2017).

Innovative didactic teaching approaches, supported by modern ICT, change traditional methods and the students' learning environment, and contribute greatly to achieving better taxonomic and cognitive competence levels than the use of traditional teaching methods (Flogie, Barle Lakota, and Aberšek 2018). However, the impact of these modern-day technologies (or the learning environments supported by them) on the social competence and EI of youth has not been researched extensively. This is why the purpose of our study was to explore the impact of an effective use of ICT on young people's engagement and their interest in cooperation and interpersonal relationships, and at the same time to analyse differences in the perception of this issue between youths, their parents and teachers.

Social competence and today's youth generation

Social networking and instant messaging are something quite ordinary to the young people of today; applications supporting these and similar kinds of processes are constantly running in the background on their cell phones. They spend an enormous amount of time online, shaping different online identities. According to the older generation, they are careless in posting their online content, and unaware of the consequences of their actions (Tapscott 2009). From a sociological point of view, we can say that this generation wants to be actively involved in everything that touches their lives in any kind of way (Šverc, Flogie, and Razbornik 2011). Their social networks are virtual, physical and even hybrid. They establish new social connections online with ease. Social interactions are the foundation of a young person's psychosocial development (Areepattamannil and Myinte 2017), both in the private and in the school environment. When young people feel a sense of belonging at school, their engagement is often enhanced; when they do not, behavioural problems often follow (Juvonen, Espinoza, and Knifsend 2012). Undesirable behaviour, disinterest and non-cooperation in school and a negative attitude towards school are, of course, related not only to lower learning achievements but also to lower levels of emotional well-being, dropping out of school, misbehaviour and delinquency and, last but not least, substance abuse (Axon *et al.* 2018; Kupferberg, Bicks, and Hasler 2016; OECD 2013). 'Moreover, experts tend to alarm that digital technologies influence negatively on cognitive development and self-control of modern children. An extreme point of view has been reflected in an elaboration of the "digital dementia" concept that combines cognition states of young ICT users and similar states of brain with cognitive disabilities' (Proekt *et al.* 2017). However, neuroscientists' views on this matter are divided; Pirtošek, for example, claims that digital technologies do not have a negative impact on the cognitive development of young persons' brains, nor do they influence dementia (Pirtošek 2017).

Innovative pedagogy

The *Innovative pedagogy* project has developed innovative implementation curricula based on modern pedagogical paradigms and methods that support individualisation and personalisation of teaching, using ICT. In the framework of the developed implementation curricula, innovative strategies, models and approaches to teaching and learning in the classroom have been tested. The methodology (the 21-step model) of implementing *Pedagogy 1:1* was tested in real-life classrooms, with monitoring and evaluation of all the phases of the process. Within the project, special focus was given on monitoring the direct connection between contemporary teaching and learning methods, and their effect on students' achievements and their social and psychophysical characteristics, such as motivation for learning, engagement and approaches to learning, attendance at school, confidence in their learning abilities and own efficiency, and so on. The methodology used is known as the triangulation technique (collecting information from students, parents, teachers and principals) (Aberšek *et al.* 2017).

Research methodology

The study was conducted in 2015–2016 as part of the pilot project *Innovative pedagogy 1:1* (Innovative pedagogy, 2018) and is currently in the second phase with the name *Innovative learning environments supported with ICT* (2017–2022). The project is now in the implementation part. The final results of the second phase will be available at the end of 2021. Initially, a pilot study was used to train the teachers, who then taught according to this new methodology (the 21-step sequence to implement innovative approaches to ICT-supported teaching and learning) for 2 years (Queensland Government, Department of Education, Training and Arts 2018). Throughout this period, the parents were able to monitor the pedagogic process indirectly, through their children's responses, and directly, through the information received from the school authorities because innovative pedagogy assumes, among other things, an active involvement of parents (Balaskant 2013) to successfully set up an effective innovative learning environment. For the evaluation of the project, a specialised instrument was developed, consisting of questionnaires for youths and their parents and teachers. Some of the students' responses have already been published in a parallel study, which showed that the proposed approach has a positive psychosocial impact on youths (their motivation for going to school was higher, and they achieved higher taxonomic levels of knowledge) (Flogie 2017).

Previous studies (Fiksl, Flogie, and Aberšek 2017) have confirmed a positive attitude of youths towards innovative teaching methods. The aim of the present study was to define the impact of innovative ICT-supported teaching approaches on young people's engagement and their interest in collaborating and interpersonal relationships, from the perspective of teachers and parents. These aspects are an important segment of an individual's social competence and EI. The survey questions referring to the level of interest in collaboration were thus addressed to parents and teachers, who have kept track of the students' progress and attitudes throughout the entire survey period. We believe that the research questions were thus answered from a different and broader perspective.

Research sample

A sample of 127 parents and 69 sixth-grade primary school teachers from five regions participated in this study. From each of the schools, an entire classroom was selected, and no further selection of students from those classes was made. The survey therefore involved these students' parents and the teachers teaching in these classes. In most cases, the viewpoints from both parents of an individual student were unified, meaning that a single answer was provided to each of the survey questions; some parents, however, answered separately, that is, the mother and the father provided answers individually. A five-point Likert scale was applied in the survey, with 1 representing 'completely disagree' and 5 representing 'completely agree'.

Research results

The key research question was whether the use of ICT in classes has an impact on the level of engagement and interest in collaboration, and whether it affects the relationships between the students, as well as between students and teachers.

The IBM SPSS program was applied for statistical analysis. The reliability of the questionnaires was tested using Cronbach's alpha. In our case, the latter is $\alpha = 0.943$, which indicates a high degree of reliability.

Descriptive statistics for individual groups (parents and teachers) are shown in Table 1.

A Levene's test assessing the equality of variances showed that the variance was not homogeneous, which is why the Welch test, which is more robust, was applied (Field 2005). The test was used to establish whether there are statistically significant differences between the parents' and the teachers' viewpoints on the research question (Table 2).

Table 1. Descriptive statistics.

	Group statistics				
	Parent/ Teacher	N	Mean	Std. deviation	Std. error mean
The use of ICT in classes has a positive impact on the engagement and motivation of students in school, and on learning in general.	Parent	127	3.72	0.983	0.087
	Teacher	69	3.83	0.727	0.087
The use of ICT in classes has a positive impact on collaboration between students and teacher.	Parent	127	3.77	1.009	0.090
	Teacher	69	3.88	0.758	0.091
The use of ICT in classes has a positive impact on collaboration between students.	Parent	127	3.79	1.044	0.093
	Teacher	69	3.78	0.802	0.097
The use of ICT in classes has a positive impact on communication between students, teachers and parents.	Parent	127	3.69	1.158	0.103
	Teacher	69	3.68	0.795	0.096
The use of ICT in classes has a positive impact on building a student's self-image; students consider classes interesting and like going to school.	Parent	127	4.05	0.765	0.068
	Teacher	69	3.19	0.896	0.108

Table 2. Welch test.

	Independent samples test								
	Levene's test for equality of variances				T-test for equality of means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% Confidence interval of the difference	
							Lower	Upper	
The use of ICT in classes has a positive impact on engagement and motivation of children in school, and on learning in general.			-0.887	176.362	0.376	-0.110	0.124	-0.353	0.134
The use of ICT in classes has a positive impact on collaboration between students and teacher.			-0.879	174.652	0.381	-0.112	0.128	-0.365	0.140
The use of ICT in classes has a positive impact on collaboration between students.			0.036	172.083	0.971	0.005	0.134	-0.259	0.269
The use of ICT in classes has a positive impact on communication between students, teachers and parents.			0.084	183.529	0.933	0.012	0.140	-0.265	0.289
			6.741	122.209	0.000	0.859	0.127	0.607	1.111

Discussion

The results of descriptive statistics presented in Table 1 show that the viewpoints of parents and teachers of youths in innovative classes are fairly uniform and with a high average response value of around 4, which is equivalent to the answer 'I agree' in the questionnaire. Parents and teachers consider that the use of ICT in classes has a positive impact on the engagement and motivation of youths in school and on learning in general. They also believe that a meaningful and effective use of ICT in classes has a positive impact on collaboration and communication between students themselves, as well as between students and teachers. The only question that indicates statistically significant differences between the viewpoints of parents and teachers is '*The use of*

ICT in classes has a positive impact on building a student's self-image; students consider classes interesting and like going to school. This statement is on the border between a psychosocial and a social description of youths, and the statistically significant difference between views was also confirmed by the Welch test. In comparison to parents, teachers consider that the positive impact of using ICT in classes is lesser. If we compare this question to the national TIMSS 2015 survey and examine the answers provided by students from innovative classes (Flogie 2017), we can observe that the parents' outlook on this question is a much more optimistic one than that of students and teachers. We can conclude that a meaningful and effective use of modern ICT is of great importance to young people; it can be perceived as a new kind of an educational communication channel, which is something their teachers and parents are very well aware of. Through such an approach, the engagement of youths in school is also greater, which also contributes to better relationships and an increased interest in cooperation. We can confirm that young people's parents and teachers have a positive attitude towards a meaningful use of modern technology and innovative didactic teaching approaches that are supported by contemporary information and communication technologies. This kind of approach generates a positive climate and creates an environment that helps to increase an individual's social competence and their EI. After 2 years of the second phase of the new project, first preliminary results are available. They are in the line with the results of this pilot study. Especially important is that preliminary results again show that effective use of ICT in classes has a positive impact on collaboration and communication between students themselves, as well as between students and teachers. We will be able to prepare final longitudinal study, when the final evaluation will be finished (presumably in 2022).

Conclusions

This study confirmed that innovative didactic teaching approaches supported by modern ICT have a positive impact on the engagement of youths in school and their interest in collaborating with their peers and teachers, which is the foundation for developing their social competence and EI, and a fact that is recognised by both youths themselves and their teachers and especially parents, who are the most optimistic in this whole process because they consider, from a critical distance, the contribution of a meaningful use of ICT in the field of social competences and EI of young people to be even greater (in comparison to the teachers' views). With a comprehensive innovative pedagogical approach that directly involves parents, we can set up a learning environment where technology represents an important educational communication channel, that is, an environment that makes a positive contribution to the development of social competences in youths on the level of interpersonal relationships. In any case, it should be emphasised that the great success of the first project was the reason that the Ministry of Education of the Republic of Slovenia began with the second phase of the project called Innovative Learning Environments supported by ICT acknowledging that the question of the impact of innovative education and ICT on changes in the pedagogical paradigm is more topical than ever.

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