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Emotional intelligence of children with special needs using innovative technologies

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ABSTRACT

The research examines the emotional intelligence of school-age children in Kazakhstan and Russia and develops a set of strategies to teach students emotional intelligence. The study was conducted on the basis of the Weisinger's five-dimensional model methodological framework based on the classical model of Coleman's emotional intelligence. The research bases on data collected from 185 secondary school teachers in Kazakhstan and Russia who work with children with special needs. The participants filled out an 11-item questionnaire with 10 closed and 1 open-ended question. The results revealed that emotional intelligence played a vital role in the overall development of children, especially those with special needs. The level of emotional intelligence was also diagnosed in 264 sixth graders in the study region using the Weisinger Emotional Intelligence test twice; second test after one month of informational technologies for emotional intelligence improvement use. The results of the first test indicate a low level of emotional intelligence in the studied sample of children with disabilities (female=55.4, male=37.5); the result of the second test showed statistically significant small changes for the better (from 44.19 to 48.92 mean score in the sample).

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1. INTRODUCTION

Emotional intelligence (EQ) is an integral aspect of personal development. The originator of the EQ concept, Coleman, and a significant portion of EQ researchers define it as the capacity to recognize, understand, apply, and manage emotions, as well as the ability to empathize, effectively communicate, overcome conflicts, and handle challenges that arise in the course of interpersonal interactions [1]–[3]. According to the mixed model of emotional intelligence (EI) proposed by Bar-On, there exist 15 components distributed across five domains: self-awareness, self-regulation, social awareness, social skills, and stress resilience. In its entirety, this approach is more comprehensive, encompassing both individual and social indicators [4]. Furthermore, the Mayer-Salovey-Caruso emotional intelligence test (MSCEIT) model is also defined as a model of emotional intelligence, consisting of four fundamental components: perceiving emotions, using emotions, understanding emotions, and managing emotions. A key aspect of this theory is that emotional intelligence can develop throughout a person's lifetime, shaped by various factors such as the environment, family, temperament, and others [5].

Special education pertains to specially designed instructions that cater to the unique educational needs of individuals with specific disabilities, irrespective of the setting (classroom, home, or medical

facility) [6]. As implied by its name, special education is a specialized branch of education that engages those who do not participate in the general educational curriculum as regular students. The constraints imposed on an individual due to the consequences of injuries, specific medical conditions, or developmental peculiarities are almost invariably accompanied by psychological traumas, and difficulties in communication, self-identity, and behavior [7]. Consequently, the enhancement of emotional intelligence may enable students with special needs to mitigate or alleviate these types of problems and significantly enhance both academic performance and social skills [1], [8], [9].

Emotional intelligence can be effectively applied to the education of individuals with disabilities and those at risk. The spectrum of pedagogical practices is extensive. These practices are employed exclusively by specially trained educators and do not manifest in the traditional classroom setting [10], [11]. Educational and special instructional programs, in particular, must place greater emphasis on strategies for developing EQ [12], [13]. However, emotional intelligence is considered a more pivotal determinant of success in life when compared to general intelligence (IQ) [14], [15].

The development of emotional intelligence in children with disabilities encounters numerous challenges stemming from their specific limitations and socio-psychological factors. Among them, important issues that can influence emotional well-being and social adaptation are highlighted [16]. Firstly, social isolation can restrict opportunities for interaction and the development of communication and empathy skills. Children with disabilities often face stressful situations that may affect their emotional states and self-regulation. Inadequate access to resources and development programs can limit their potential for awareness and the development of emotional intelligence. Stereotypes and stigma can act as barriers to the expression of their emotions and receiving support from others. Active digitalization contributes to improving the access of children with disabilities to various tools and resources. Technological innovations in education offer several opportunities for enhancing the development of emotional intelligence in children with special educational needs and disabilities (SEND) [17]. Innovative information technologies, which encompass the use of digital environments, mobile devices, wearable technologies, specialized software, and augmented and virtual reality elements, can be successfully employed to meet specific learning needs [18]. One of the innovations is the use of mobile applications in various areas of life, including healthcare. Software developers have launched programs designed to recognize the emotions of individuals with autism. Examples of such projects include Just-In-Time In-Situ, HANDS, Wrong Planet, Proyect @ Emociones, and LIFEisGAME [19].

Research on the emotional intelligence of children with disabilities in the context of innovation is significant for several reasons. Firstly, it aids in gaining a better understanding of their emotional needs and capabilities. This can impact the development of more effective digital teaching and support methods aimed at enhancing the quality of life. Research can unveil the unique aspects of the emotional experiences of children with disabilities as well as their behavior with digital technologies. Understanding these aspects can help create a more inclusive environment that takes into account their needs and promotes their psychosocial development.

2. LITERATURE REVIEW

2.1. Emotional intelligence in education

In recent years, educational institutions have been putting more effort into promoting emotional intelligence in students, including those with disabilities. The benefit of this dedication goes far beyond human communication and adaptation processes. Chinese scholars have found a correlation between students' emotional intelligence and academic performance [20]. Basic emotions are an important source of a child's linguistic and cognitive development, reasoning ability, and reflection skills [21], [22]. The research conducted in Lithuania found that teachers devoted time to the development of emotional intelligence in junior school-age children. However, teaching emotional intelligence differs in children and adults. For instance, older children already have the necessary skills and thus receive less emotional intelligence training. The authors suppose that for adult learners' academic achievements are more important and they spend more time on learning activities. High school students focus on the social aspects of emotional intelligence, such as empathy and social awareness [23]. Emotional intelligence influences greatly learning abilities and critical thinking. By developing their emotional intelligence, children can become more productive and successful at what they do. Critical thinking provides the crucial link between intelligence and emotions and helps students to think in an organized and critical manner and understand connections between ideas and facts [24].

Emotional intelligence has a positive impact on the children's psychological state and gives socially preferable control over selfish intentions and impulses. Emotional intelligence leads to empathy, attentive listening, and concern for others. Empathy influences the likelihood of caring, altruism, and compassion. Looking at things from the perspective of others breaks stereotypes, and fosters tolerance and diversity [25]. The scholars present seven principles that guide human thinking and propose a revision of the earlier statements on emotional intelligence [3]. These principles suggest that emotional intelligence: refers to the

ability of the mind; refers to a broad view of how the mind operates while being focused on information processing; which means a broad view of intellectual capacity; has to be viewed as the ability; the intellectual aspect of problem-solving is not reflected in intellectual behavior; test indicators for measuring emotional intelligence should be clearly defined as a precondition for further analysis; effective tests should measure the mental abilities of an individual.

2.2. Emotional intelligence and special education

Previously, most children with disabilities were excluded from traditional education. Today, many countries support inclusion programs for children with special educational needs and disabilities (SEND). Inclusion in education means ensuring that all students, including those with disabilities, have their needs fulfilled. Modern education ensures equal opportunities for all students to receive education and teaching support at schools that are age-specific and close to their place of residence. This educational policy helps all students to enter the workforce and feel equal in society [10]. An exclusion means that students are not permitted to register to attend school; they may be removed from schools or denied access to education. In education, segregation is defined as the isolation of students in separate educational institutions or barriers to communicating with peers [26]. For example, the current US legislation encourages students with disabilities to participate in mainstream classrooms [27].

Children with disabilities almost always have special needs [10]. The very existence of such needs creates emotional problems and contributes to anxiety, isolation, low self-esteem, and reduced sociability and concentration on one's inner world [28]. Emotional intelligence can be an effective means of stopping these processes and can be a powerful stimulus for improving the psychological well-being and success of children with disabilities. Special needs should be considered and accepted as a natural part of the child's life, but not emphasized and the child should be offered a variety of strategies for coping with any situation, taking into account his special needs. Confidence in your ability to cope leads to self-confidence and greater emotional openness. On the other hand, emotional intelligence in a child with special needs will help him to better cope with various situations in which other people are involved [29].

Some current research proposes the 10 most efficient strategies to improve emotional intelligence in children including: i) educators should identify emotional triggers and manage the situations that trigger negative emotions, for instance, anger; ii) teachers should identify the special needs of the child; iii) educators should raise self-awareness in children and teach them self-control strategies; iv) teachers should provide children with assignments on observation and emotional development to improve their social adaptability skills; v) educators should teach children how to set short-term and long-term goals throughout life; vi) educators should develop in children positive thinking and motivation; vii) educators should analyze topics studied at school and home and choose only appropriate additional materials for a child; viii) teachers should develop a sense of responsibility in children to make them feel responsible for their emotions and behaviors; xi) educators should provide a child with a wide range of opportunities; x) teachers should ensure a trustworthy and safe environment for children to express their feelings [12]. Educators with advanced emotional skills help students quickly adapt to changes than those educators with low emotional skills. According to the research conducted in Greece, high emotional intelligence has a positive impact on job satisfaction and prevents burnout. Therefore, emotionally intelligent educators have lower burnout rates and higher job satisfaction [30]. The research conducted in Jordan found a correlation between low burnout rates and high levels of emotional intelligence among educators. It also revealed that factors such as gender, work experience, and educational background were not contributory in this case [31].

2.3. Development of emotional intelligence in children with special needs

Health problems in children influence the development of their emotional intelligence. For example, previous researchers found correlations between autistic traits and the following factors: complaisance, extraversion, conscientiousness and neuroticism. Therefore, individuals with autistic traits may exhibit unique personality traits. Emotional intelligence is negatively associated with autism, and individuals with autistic traits display more emotional problems [32]. The research conducted in India identified a correlation between social adaptation and emotional intelligence. The major finding was that students with good eyesight exhibited higher levels of intelligence than those with lower vision [33].

For the development of inclusiveness in school education, researchers consider one of the most important factors to recognize and assess the real special needs of students and the means by which the provision of these needs can be integrated into the normal learning process [24]. Special cognitive needs are provided quite simply and effectively with the help of mobile applications, the work which should be carried out under the guidance of a teacher and the supervision of parents at home [2]. A child with special cognitive or other needs can then use these apps and features on their own. To do this, it is necessary to develop the digital literacy of students from a very early age [8]. A partial digital environment at the stage of sufficient

acquisition of the necessary digital literacy skills by students with special needs makes them much more independent [1]. Greater autonomy in learning and increased academic achievement promote motivation and greater openness in communication [28], [29]. The development of emotional intelligence can participate in such a process of revealing the identity of students with special needs in connection with technological digital tools. A critical overview of the academic sources reveals that emotional intelligence development plays a vital role in children with special educational needs and disabilities. Unfortunately, the school administration pays little attention to emotional intelligence. Emotional intelligence has a great impact on learning and personality development, so educators should create an inclusive curriculum for SEND children. The research analyses emotional intelligence in secondary schools in Kazakhstan and Russia and identifies shortcomings related to emotional skills. The research develops a framework providing a road map for educators working with children with SEND. The research objectives are to collect information on emotional intelligence development in secondary school children with disabilities in Kazakhstan and Russia, investigate the perceptions of educators about the problem, and develop a framework for developing emotional intelligence in school-age children with special educational needs.

3. RESEARCH METHOD

3.1. Research design

The study employed a mixed-method research approach, incorporating both qualitative and quantitative research methods. The study included two surveys, one for teachers and one for students. For teachers, the survey was conducted once based on a questionnaire compiled by the authors and containing questions that include all the main significant topics covered by this study in a logical order. The students were interviewed twice, before and after the intervention, which used information technology. After the researchers verified that all participants used various methods of digital technology support for the students of the participants for a month, a second test was conducted. The results of the first and second tests were compared by student's t-test to verify that the application of innovative numerical methods gave statistically significant differences in the results regarding emotional intelligence among students.

Students were surveyed using the Weisinger emotional intelligence test, which was used to measure respondents' level of emotional intelligence [25]. The Weisinger emotional intelligence test consists of 45 behavior-based statements, each of which is assessed on a 7-point Likert scale, in which a score of 1 indicates minimally low ability and 7 points indicates very high ability. Intermediate scores do not have a strict and definite description, the respondent chooses from them on the basis of his intuitive feeling, which best describes him. The questionnaire is based on Goleman's basic theory of emotional intelligence [1]. This instrument was specifically chosen for this study because research has substantiated this instrument with executive data. The reliability of the method was further confirmed. The reliability and validity of this measurement method have been repeatedly tested by researchers, in particular, by factor analysis methods [2], [34], [35]. In the study, the internal reliability of Weisinger's five-dimensional model (intrapersonal components, interpersonal components, adaptability components, stress management components and general mood components) of emotional intelligence was tested by Cronbach alpha method (α=.814). The questionnaire was digitized using Google Forms.

3.2. Sample

The research was carried out using a questionnaire. A similar approach was used in the previous researches [23], [32]. It helped to collect information from a large pool of respondents within a relatively short period. The study sample includes 185 secondary school teachers who work with children who have special educational needs in eight schools in Kazakhstan and Russia. Invitations to participate in the research were sent to respondents at their workplaces. The age of respondents ranged from 26 to 54 years. The working experience varied from 1 year to 28 years as shown in Table 1.

Table 1. Demographic characteristics of the teachers' respondents

Variable		Total
City/Country	Elabuga, Russia	91
	Almaty, Kazakhstan	94
Age	26-35	69
	36-45	59
	46-54	57
Gender	Female	118
	Male	67

At the same time, 264 students with special educational needs from the studied educational institutions were interviewed (mean age=11.5, SD=.37). Gender structure of the respondents was 117 females (44.3%) and 147 males (55.7%). Respondents were sixth graders from eight schools in Kazakhstan and Russia. Based on the total number of sixth graders studying in these schools (general population), the permissible sampling error does not exceed p=4.83. Thus, the used sample can be considered representative enough for the study purposes. Detailed information on the types of disabilities and the special needs of student participants is presented in Table 2.

Table 2. Demographic characteristics of the student respondents by type of special needs

	Autism	Mental ADHD	PDDs	Psychological
Males	28	36	35	18
Females	39	44	42	22

The selection of schools, classes, teachers and students in both countries was carried out by random sampling based on officially known data on schools, students and teachers. Randomly selected participants were invited to take part in the study, and if they refused, the offer was made to the next randomly selected participants. In the case of students, the proposal was sent to their school and class leadership via e-mail and then passed on to the parents and the students themselves. Pupils could take part only with the consent of their parents (guardians) and themselves at the same time. Ultimately, those schools and classes were selected in which a sufficient number of teachers and students with special needs from their classes agreed to participate in the study. Inclusive classes were selected, in which students with special needs were present and specialized classes were designed for such students.

3.3. Survey

Educators were asked to fill out a 20-minute questionnaire in a school classroom on either of the following three days: September 13, 2021; September 15, 2021; and September 17, 2021. The researchers were present in the classroom between 11:00 and 14:00 each day to control the data collection process.

The questionnaire had 10 close-ended questions and 1 open-ended question (question #11). The research collected information about teachers' attitudes towards developing emotional intelligence in children with disabilities and their working experience in classes with children who have special needs. Moreover, the questionnaire asked teachers how they felt about having more lessons aimed at emotional intelligence development. The close-ended questions could be answered with ‘yes’ or ‘no’. These questions were as:

- Are you familiar with the concept of emotional intelligence? (Yes/No)
- Is it important to teach emotional intelligence to school-age children? (Yes/No)
- Is it important to teach emotional intelligence to children with special educational needs? (Yes/No)
- Is there enough time to teach children emotional intelligence at your school? (Yes/No)
- Do school-age children exhibit emotional skills? (Yes/No)
- Do children with special educational needs exhibit self-management skills? (Yes/No)
- Do children with special educational needs exhibit empathy (compassion)? (Yes/No)
- Do children with special educational needs exhibit adaptive qualities? (Yes/No)
- Can children with special educational needs work as a team? (Yes/No)
- Is it necessary, in your opinion, to spend more time teaching children with special educational needs emotional intelligence? (Yes/No)
- Please, express your opinion on how to teach emotional intelligence in your school and provide details (if necessary).

3.4. Intervention

After conducting this test, teachers and parents of children were invited to use digital tools to relieve problems specific to the special needs of specific children. In most cases, it was the need to solve emotional problems and communication in children with Asperger’s syndrome and autism, who were invited to use specialized LIFEisGAME mobile applications with the help of parents, older friends or trusted caregivers. They were also encouraged to turn to virtual resources like wrong planet to support people with similar needs. Parents and caregivers have been advised to take note of the valuable advice that can be obtained from such resources regarding handling special learning needs, and such as the use of dedicated headphones to ensure no distraction. The use of specific technological means was not stipulated, only the use of technologies: the internet, cloud services, mobile applications, and virtual learning tools at the discretion of

children and adults. After one month of using such tools, a second blitz survey was conducted on which of the survey participants used innovative technical tools. At the same time, the actions of the parents were controlled according to their consent, and the use of all tools was regulated in accordance with the convenience, reactions and success of each child.

3.5. Data analysis and statistical processing

The data were analyzed using Microsoft Excel. Responses to question #11 were also analyzed. The student's t-test was used to compare indicators and determine the statistical validity and significance of the study results. The student's t-test was used to compare indicators and determine the statistical validity and significance of the study results.

3.6. Ethical issues

All respondents were informed about the procedure and objectives of the research. They received the required information in printed form on A4 sheets. Each of the respondents signed written consent for participation in the research and agreed to follow its rules. The completed research questionnaires were not shared with any third party. The authors declare that the work is written with due consideration of ethical standards. The study was conducted in accordance with the ethical principles approved by the Ethics Committee of Abai Kazakh National Pedagogical University (KazNPU). Before the research, university hospitals conducted an examination of the physicians to assess the appropriateness and adequacy of experimenting. All respondents received medical clearance.

4. RESULTS

The results of the emotional intelligence test obtained in Table 3 indicate that both sides of the gender division are characterized by an insufficient level of emotional intelligence. The significance criterion was tested for the significance level p=.01. To conduct the t-test, 117 participants were randomly selected from a group of male students, so that the number of participants in the test was the same, as required by the student's t-test. The test results in both groups were checked by the Shapiro-Wilk method for closeness to the normal distribution of values. For the male group W=.982, and for the female group W=1.007, which can be estimated as a distribution close enough to normal. The results of an independent student's t-test can be assumed that there is a significant difference between male and female students with special educational needs in terms of emotional intelligence as shown in Table 3. The higher average score of the female students shows that they are more emotionally intelligent, but both groups have low levels of emotional intelligence.

Table 3. The level of emotional intelligence in the gender division

Variable	N	M	SD	df	t	p
Female students	117	55.4	1.9	116	2.619	0.001
Male students	117	37.5	2.1			

According to the results of the second test, the average level of emotional intelligence in the entire sample turned out to be higher (48.92 compared to 44.19 for the first test). Despite the fact that the indicator of emotional intelligence remains relatively low, in the case of using digital technical means to improve the quality of emotion recognition, facilitate learning and accompany the special needs of students, there is an improvement. comparison of test results using student's t-test indicates that the noted changes for the better are statistically significant. and not random aberrations as shown in Table 4.

Table 4. Comparison of the results of the Weisinger emotional intelligence tests (Student's t-test)

	Mean	SD	df	t	p
First test	44.19	3.14	263	1.969	.002
Second test	48.92	3.87			

4.1. Are you familiar with the concept of emotional intelligence?

The percentage of positive responses was 58%, whereas 42% of the respondents answered 'No'. Most respondents were not familiar with the concept of emotional intelligence. Hence, much more attention should be paid to it in Russia and Kazakhstan. Educators should receive additional emotional intelligence training.

4.2. Is it important to teach emotional intelligence to school-age children?

More than half of the respondents agree that it is important to teach emotional intelligence to school-age children (64%) and about one-third of the respondents (36%) disagree with this statement. Despite the limited knowledge of emotional intelligence, the majority of teachers underline the importance of teaching it at school. The likely reason behind this awareness is that they have noticed the problems experienced by children with low emotional skills.

4.3. Is it important to teach emotional intelligence to children with special educational needs?

According to 73% of the respondents, there is a need to teach children with special educational needs emotional intelligence. Children with higher emotional intelligence have less anxiety and depression and experience greater overall well-being. Thus, it can be stated that these competencies are underdeveloped in children with disabilities. Educators should spend much more time on the development of emotional intelligence among children with special needs than ordinary children. Only 27% of the respondents disagree with this statement.

4.4. Is there enough time to teach children emotional intelligence at your school?

About one-third of the respondents (33%) agree that they have enough time to teach children emotional intelligence. Time constraints were a problem for 67% of the respondents. In Russia and Kazakhstan, the school staff do not have enough time to teach emotional intelligence. Hence, school administration should incorporate emotional intelligence as a part of their curriculum.

4.5. Do your school-age children exhibit emotional identity?

The results show that 24% of the participants agree with this statement and 76% disagree with it. These findings suggest that children lack the skills to develop emotional identity and self-awareness. To solve this problem, teachers should spend much more time on the development of emotional intelligence in children.

4.6. Do your children with special educational needs exhibit self-management skills?

About one-third of the respondents (31%) agree with this question while two-thirds of the respondents disagree with it (69%). The findings suggest that most students are unable to control their own emotions and educators will have to develop their emotional intelligence. Its significance results.

4.7. Do your children with special educational needs exhibit empathy (compassion)?

While 36% of the respondents answered ‘Yes’ to item seven, 64% answered ‘No’. Educators suggest that children with special educational needs rarely exhibit empathic behavior. It can be explained by the fact that teachers pay little attention to the development of emotional intelligence in a school setting. There is a need to cultivate empathy in children with special needs.

4.8. Do your children with special educational needs exhibit adaptive qualities?

In question 8, only 21% of the respondents answered ‘Yes’, whereas 79% of the respondents answered ‘No’. It is difficult for children with disabilities to adapt to a school setting. The development of emotional intelligence could improve their adaptive behavior patterns.

4.9. Do your children with special educational needs can work as a team?

It is surprising that in question nine, 30% of the respondents answered ‘Yes’ and 70% answered ‘No’. Most children with special educational needs experience difficulties working as a team. Underdeveloped adaptation skills and poor communication with peers are the main causes of this problem. The development of emotional intelligence could improve their group work.

4.10. In your opinion, is it necessary to spend much more time teaching children with special educational needs emotional intelligence?

The majority of the respondents (84%) agree that it is necessary to spend more time on teaching emotional intelligence to children with special needs while some of the educators (16%) state that it does not play a vital role. Educators should devote time to the development of emotional intelligence in children with special educational needs. Therefore, additional training is required for teachers working with children with special needs and disabilities.

There were some of the teacher’s responses to question #11. The proposed answers of the respondents were selected as the most vividly representative of a certain typical class of answers for a significant group of teachers. Thus, four groups of answers were received, for which examples are presented.

Respondent 1: "*Working with both healthy children and children with disabilities, I often notice that children with special needs struggle to work as a team and it is hard for them to communicate with peers. They often isolate, withdraw into themselves, and do not participate in any activities. In my opinion, emotional intelligence could help them to participate in group work and feel more comfortable in the school setting*."
Respondent 2: "*In my school, teachers' pay special attention to academic achievements rather than to emotional intelligence. I think that knowledge is very important, but it is crucial to develop creative abilities and communication skills. Emotional intelligence plays a vital role here*."
Respondent 3: "*I think that knowledge and emotional intelligence depend on many factors, not just education quality. If children feel comfortable being involved in a team activity, can develop relationships with peers, as well as the ability to express feelings, their academic performance is high*."
Respondent 4: "*Communication is one of the most important skills. Emotional intelligence is the basis for successful communication. Children with disabilities may face communication difficulties that lead to low academic achievements*."

As can be seen, the majority of respondents emphasize the need to develop emotional intelligence for children with disabilities and allocate time for teaching emotional skills. Based on the experience of teachers presented in the interviews and on the results of the application of the described intervention, a framework is proposed for the gradual creation of a system for teaching emotional intelligence to children with special educational needs as shown in Table 5. The framework is based on the fact that this learning system is implemented without prior training of teachers, so its first stage includes teacher training, trial implementation as the second stage for obtaining primary experience and its analysis, and through the analysis of results until the full implementation of this system in an educational institution. Adopting the framework in an educational setting can improve emotional intelligence in school-age children, including those with disabilities. The results should be monitored throughout the whole process.

Table 5. Framework for teaching emotional intelligence in children (including those with disabilities)

	Stages	Description	Time
1	Courses for teachers (if necessary) 'Development of emotional intelligence in a child'	If school teachers did not teach emotional intelligence to children with SEND, they need training (classroom-based or online courses) with the involvement of ICTs and teachers are trained in their application	1-2 months
2	Trial implementation of emotional intelligence program in secondary schools (1-2 hours a week)	Development and implementation of an emotionally intelligence classroom with ICTs involvement	6-10 months
3	Results testing	Monitoring changes in behavior patterns and learning outcomes of children (adaptability, communication, conflicts, assessments, creativity, and leadership) and clarification of the individual effectiveness of the applied ICTs	4-6 months
4	Wider implementation of emotional intelligence in secondary schools (4-6 hours per week)	Under the proposed framework, teachers will devote more time to developing an emotionally intelligent classroom with ICTs framework. If the results of the previous stage are negative, the content of the classroom should be revised.	6+ months

5. DISCUSSION

The findings reveal that most teachers understand the pivotal role of emotional intelligence for school-age children, especially for children with special educational needs. Emotional skills help children to participate in teamwork, communicate with peers, successfully acquire knowledge and skills, develop creativity, express their emotions, and much more. Emotional states influence personal and interpersonal relations and may have an impact on academic achievements [36]. Emotional intelligence and emotional learning are associated with better mental health and influence psychological adaptation. Therefore, the development of emotions can help to overcome learning difficulties, mental disorders and conflicts [36], which is partly confirmed by the results of the study presented here.

The findings suggest that the developed emotional intelligence for helping children build stronger relations and adapt to social conditions can be effectively stimulated with the help of information technology. Emotional skills influence future career choices and determine how children view the direction and meaning of life. The scholars from India found that those children who were able to manage their emotions and interpret the emotions of other people became more adaptable and responded more quickly to changing environments [12]. Children with high levels of emotional intelligence are more motivated and emotionally competent than their peers.

Around the world, school administrations have not allocated time for emotional intelligence, both for ordinary children and children with disabilities. The main focus is on academic achievements. For example, the analysis of schools in Turkey shows that much more time is spent on the development of mental abilities rather than on emotional intelligence. The authors recommend spending more time on the development of emotional intelligence [37], which is also confirmed by the results of our study. Emotional intelligence influences the cognitive functions of students which help them to acquire knowledge and develop their talents despite their disability. An intriguing study delineates the value of emotional intelligence development within the context of innovation. The authors of the article note that VR games can be particularly beneficial for children with special educational needs and disabilities (SEND) who encounter challenges in comprehending and managing their emotions. VR games can furnish children with SEND with an engaging and realistic environment in which they can practice their emotional intelligence skills within a safe and controlled setting [38].

The research claims that emotional intelligence programs should be tailored to meet the needs of school-age children and be a part of the curriculum. Some previous research also points to the paramount need to determine the best means of meeting the special needs of students. Turkish scientists have researched how such programs affect school children. The results showed that emotional intelligence improved emotional skills and had a positive impact on emotional skills [39]. An important element of effectiveness may be the freedom to use the various digital and technological tools available, not driven by centralized choice of teacher or school, but dependent on students and their parents [40], [41]. This approach was implemented in the present study and gave a positive, although not significant result, which may be due to the short duration of the intervention (one month). However, in other publications, the importance of fostering emotional intelligence in children with special needs is emphasized. Students with special educational needs and disabilities are at risk of diminished emotional intelligence, which may be attributed to their specific characteristics, self-perception, and emotional interactions. Emotional intelligence can be nurtured in SEND students through social-emotional learning, cognitive-behavioral therapy, and emotion management training [42].

Some studies provide experience in applying various elements of the digital environment to meet special educational needs [8], [43]. Such elements include certain educational software, mobile applications, special messengers, and technical means for the attractive presentation of information, considering the specific perception of children with special needs. Since the child often turns to mobile devices, he can independently perform exercises or tasks related to his emotional development. Some researchers emphasize that such use of digital tools and information technologies requires the participation of parents or teachers to guide and motivate the efforts of the child himself [19]. Self-defeating IT all too easily leads to distractions, distractions, or misuse of technology [32], [44]. In the study proposed here, adult participation was a prerequisite for the intervention and this experience was taken into account. The successful life of any person depends upon many factors including the ability of an individual to identify the emotions of others, and thus to develop a favorable relationship with peers. Therefore, children have to be able to control their emotions, be emphatic, and work in a team. The researchers from Malaysia analyzed the impact of five elements of emotional intelligence such as self-awareness, self-motivation, emotional management, empathy, and interpersonal skills on the academic achievements of high school students. The results showed that emotional intelligence helps to develop the cognitive abilities of children. Moreover, the authors suggest that the development of emotional intelligence of school-age children plays a pivotal role in the overall children's development [44].

However, the implementation of technological practices in this specific domain faces several challenges. In general, emotional intelligence serves as a positive predictor of the quality of strategic decisions. Open innovation mediates the relationship between EI and the quality of strategic decisions. This process is effective, involving collaboration with external resources such as employers, families, influencers, and competitors [45]. Nevertheless, there are several challenges to overcome, including cost, accessibility, teacher training, and research. One key aspect is the qualification of educators for the successful implementation of these specificities. Therefore, for the successful integration of these technologies, it is crucial to develop programs and resources tailored to the individual needs of students, provide access to modern technology for all children with disabilities, offer teacher training and support, and research to assess the effectiveness of the use of these technologies [46].

The Russian researchers propose the guideline to develop emotional intelligence in children with disabilities: reading fiction, being involved in creative activities with peers, games (including role-playing), and labor activities [33]. The respondents suggest recommendations similar to the framework discussed. The current research found that those emotional intelligence skills were underdeveloped among children with disabilities studying at schools. Emotional intelligence includes the following elements: i) self-awareness: emotional self-awareness; ii) self-management: emotional self-control, adaptability, achievements, and

positive perception; iii) public awareness: empathy and organizational awareness; iv) relationship management: power, coach, conflict management, teamwork, and inspiring leadership. These elements are important for academic performance and life achievements.

The current research analyzed the development of emotional intelligence in children with disabilities including the following elements: emotional self-awareness, emotional self-regulation, empathy, adaptability, and teamwork. The findings revealed that children with disabilities had low or underdeveloped emotional intelligence. The research emphasizes the need to develop emotional skills in children and underlines the need to involve parents and educators in this process. Facilitating the development of their emotional intelligence as part of their resources is beneficial for children. Emotional intelligence promotes personal development, and creativity and improves communication with peers.

5.1. Research limitations

The study did not significantly limit the use of specific ICTs during the intervention, nor did it use strict controls on the timing, methods, and other features of the use of informational training tools. This limitation is due to the fact that the focus of the study was to test the impact of ICT in improving the emotional intelligence of children with special educational needs with the maximum generalization of the impact of ICT. The study of the features of the influence of specific methods or technologies is not the purpose of the study, which is a certain limitation. The research involved just a few schools in Russia and Kazakhstan. The number of participants was also limited and did not cover all the variety of types of special needs, but only the most common ones in the sample.

6. CONCLUSION

The research investigates the development of emotional intelligence among children with disabilities and its role in educational institutions. The authors found that emotional intelligence is important for children with special needs, but additional efforts are required to implement more advanced strategies. The respondents work with children with special needs. The educators suggest that emotional intelligence program helps to improve emotional skills in children experiencing difficulties while studying, communicating with peers, and developing talents using creative abilities. Further research in this field is still required. It was found that the use of ITS under the supervision of parents and teachers, even without deep control over the methodology and with the use of different tools, can significantly improve the emotional intelligence of children with special educational needs. The authors propose an emotional intelligence roadmap for educators who work with children who have special needs and disabilities. The framework has the following stages: teacher training (if necessary), testing the proposed framework in field conditions, testing the results, and implementing the framework in schools. It will take approximately 17 to 24 months to adopt this program. The research contributes to the development of emotional intelligence in children with disabilities by offering a specially created roadmap. The research advises educators, parents, school administrations, psychologists and professionals who work with children having special needs on how to develop emotional intelligence.

REFERENCES

[1] A. F. Bușu, "Emotional intelligence as a type of cognitive ability," *Revista de Științe Politice. Revue des Sciences Politiques*, vol. 66, pp. 204–215, 2020.

[2] P. Kanesan and N. Fauzan, "Models of emotional intelligence: a review," *Journal of Social Sciences and Humanities*, vol. 16, no. 7, pp. 1–9, 2019.

[3] J. D. Mayer, D. R. Caruso, and P. Salovey, "The ability model of emotional intelligence: principles and updates," *Emotion Review*, vol. 8, no. 4, pp. 290–300, 2016, doi: 10.1177/1754073916639667.

[4] A. K. Abdallah and R. Alriyami, "Changes in the education landscape caused by COVID-19: opportunities and challenges from UAE perspective," *World Journal on Educational Technology: Current Issues*, vol. 14, no. 3, pp. 544–559, 2022, doi: 10.18844/wjet.v14i3.7193.

[5] S. S. Kuo, J. A. Wojtalik, R. I. Mesholam-Gately, M. S. Keshavan, and S. M. Eack, "Establishing a standard emotion processing battery for treatment evaluation in adults with autism spectrum disorder: evidence supporting the Mayer-Salovey-Caruso emotion intelligence test (MSCEIT)," *Psychiatry Research*, vol. 278, pp. 116–124, Aug. 2019, doi: 10.1016/j.psychres.2019.05.011.

[6] I. Hagarty and G. Morgan, "Social-emotional learning for children with learning disabilities: a systematic review," *Educational Psychology in Practice*, vol. 36, no. 2, pp. 208–222, 2020, doi: 10.1080/02667363.2020.1742096.

[7] P. Rajendran, B. Athira, and D. Elavarasi, "Teacher competencies for inclusive education: will emotional intelligence do justice?" *Shanlax International Journal of Education*, vol. 9, no. 1, pp. 169–182, 2020, doi: 10.34293/education.v9i1.3494.

[8] A. J. T. T. Et. al., "Exploring digital literacy strategies for students with special educational needs in the digital age," *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, vol. 12, no. 9, pp. 3345–3358, 2021, doi: 10.17762/turcomat.v12i9.5741.

[9] F. Farhan and M. A. Rofi'ulmuiz, "Religiosity and emotional intelligence on Muslim student learning achievement," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 10, no. 2, pp. 404–411, 2021, doi: 10.11591/ijere.v10i2.20997.

[10] M. P. B. Francisco, M. Hartman, and Y. Wang, "Inclusion and special education," *Education Sciences*, vol. 10, no. 9, pp. 1–17, 2020, doi: 10.3390/educsci10090238.
[11] B. D. Ada and A. B. Dağal, "Appraisal of emotional intelligence skills of university students in terms of different variables," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 11, no. 2, pp. 790–801, 2022, doi: 10.11591/ijere.v11i2.22105.
[12] W. Mohammad Amin and S. Gupta, "Emotional intelligence of special children: a review," *Shodh Sanchar Bulletin*, vol. 10, no. 40, pp. 1–5, 2020, [Online]. Available: https://www.researchgate.net/publication/346043751
[13] I. Chaidi, A. Drigas, and C. Karagiannidis, "Autistic people's family and emotional intelligence," *Technium Social Sciences Journal*, vol. 26, pp. 194–214, 2021, doi: 10.47577/tssj.v26i1.5071.
[14] A. Abdallah and A. Alkhrabsheh, "The best leadership styles for preventing the educational crisis," *Opcion*, vol. 35, no. Special Issue 20, pp. 90–105, 2019.
[15] S. Damayanti, M. Asbari, D. Setiawan, and M. S. Saputra, "Emotional intelligence: why EI is more important than IQ?" (in Indonesian), *Literaksi: Jurnal Manajemen Pendidikan*, vol. 01, no. 02, pp. 279–285, 2023, [Online]. Available: https://literaksi.org/index.php/jmp/article/view/280
[16] M. Skura and J. Świderska, "The role of teachers' emotional intelligence and social competences with special educational needs students," *European Journal of Special Needs Education*, vol. 37, no. 3, pp. 401–416, 2022, doi: 10.1080/08856257.2021.1885177.
[17] L. Zysberg and J. Kasler, "Learning disabilities and emotional intelligence," *Journal of Psychology: Interdisciplinary and Applied*, vol. 151, no. 5, pp. 464–476, 2017, doi: 10.1080/00223980.2017.1314929.
[18] N. Adibsereshki, M. Shaydaei, and G. Movallali, "The effectiveness of emotional intelligence training on the adaptive behaviors of students with intellectual disability," *International Journal of Developmental Disabilities*, vol. 62, no. 4, pp. 245–252, 2016, doi: 10.1179/2047387715Y.0000000014.
[19] C. Papoutsi, A. Drigas, and C. Skianis, "Mobile applications to improve emotional intelligence in autism - a review," *International Journal of Interactive Mobile Technologies*, vol. 12, no. 6, pp. 47–61, 2018, doi: 10.3991/ijim.v12i6.9073.
[20] A. H. AL-Qadri and W. Zhao, "Emotional intelligence and students' academic achievement," *Problems of Education in the 21st Century*, vol. 79, no. 3, pp. 360–380, 2021, doi: 10.33225/pec/21.79.360.
[21] K. Hoemann, F. Xu, and L. F. Barrett, "Emotion words, emotion concepts, and emotional development in children: a constructionist hypothesis," *Developmental Psychology*, vol. 55, no. 9, pp. 1830–1849, Sep. 2019, doi: 10.1037/dev0000686.
[22] K. Carson, P. Phillips, and B. Birkenmeier, "Measuring emotional intelligence: development and validation of an instrument," *Institute of Applied and Behavioral Management*, vol. 2, no. 1, pp. 33–46, 2000.
[23] S. Garbenis, R. Geležinienė, and G. Šiaučiulytė, "Development of emotional intelligence in students with special educational needs," *Social Welfare: Interdisciplinary Approach*, vol. 10, no. 1, pp. 106–120, 2020, doi: 10.21277/sw.v1i10.525.
[24] L. P. Apriliana, I. Handayani, and S. A. Awalludin, "The effect of a problem centered learning on student's mathematical critical thinking," *JRAMathEdu (Journal of Research and Advances in Mathematics Education)*, vol. 4, no. 2, pp. 124–133, 2019, doi: 10.23917/jramathedu.v4i2.8386.
[25] F. E. Obiakor, "Developing emotional intelligence in learners with behavioral problems: refocusing special education," *Behavioral Disorders*, vol. 26, no. 4, pp. 321–331, 2000, doi: 10.1177/019874290102600406.
[26] B. Ahrbeck and M. Felder, "Analysis of barriers to inclusive schools in Germany: why special education is necessary and not evil," *Education Sciences*, vol. 10, no. 12, pp. 1–14, 2020, doi: 10.3390/educsci10120358.
[27] A. Rasooli, M. Razmjoee, J. Cumming, E. Dickson, and A. Webster, "Conceptualising a fairness framework for assessment adjusted practices for students with disability: an empirical study," *Assessment in Education: Principles, Policy and Practice*, vol. 28, no. 3, pp. 301–321, 2021, doi: 10.1080/0969594X.2021.1932736.
[28] C. Salavera, P. Usán, and P. Teruel, "Contextual problems, emotional intelligence and social skills in secondary education students. gender differences," *Annales Medico-Psychologiques*, vol. 177, no. 3, pp. 223–230, 2019, doi: 10.1016/j.amp.2018.07.008.
[29] F. M. Morales and J. M. Pérez-Mármol, "The role of anxiety, coping strategies and emotional intelligence on general perceived self-efficacy in university students," *Frontiers in Psychology*, vol. 10, Aug. 2019, doi: 10.3389/fpsyg.2019.01689.
[30] A. S. Antoniou, K. Pavlidou, G. Charitaki, and A. Alevriadou, "Profiles of teachers' work engagement in special education: the impact of burnout and job satisfaction," *International Journal of Disability, Development and Education*, pp. 1–18, 2022, doi: 10.1080/1034912X.2022.2144810.
[31] M. A. Al-bawaliz, A. Arbeyat, and B. M. Hamadneh, "Emotional intelligence and its relationship with burnout among special education teachers in Jordan: an analytical descriptive study on the southern territory," *Journal of Education and Practice*, vol. 6, no. 34, pp. 88–95, 2015.
[32] E. Robinson, L. Hull, and K. V. Petrides, "Big five model and trait emotional intelligence in camouflaging behaviours in autism," *Personality and Individual Differences*, vol. 152, p. 109565, 2020, doi: 10.1016/j.paid.2019.109565.
[33] A. A. Al-Khateeb, W. M. Alshurman, and I. I. A. Al-Saree, "Emotional intelligence levels among hearing-impaired and visually impaired students in Jordan," *Journal of Education and e-Learning Research*, vol. 7, no. 4, pp. 395–406, 2020, doi: 10.20448/journal.509.2020.74.395.406.
[34] N. S. Schutte *et al.*, "Development and validation of a measure of emotional intelligence," *Personality and Individual Differences*, vol. 25, no. 2, pp. 167–177, 1998, doi: 10.1016/S0191-8869(98)00001-4.
[35] R. Kant, "Emotional intelligence: a study on university students," *Journal of Education and Learning (EduLearn)*, vol. 13, no. 4, pp. 441–446, 2019, doi: 10.11591/edulearn.v13i4.13592.
[36] P. Gershon and J. Pellitteri, "Promoting emotional intelligence in preschool education: a review of programs," *International Journal of Emotional Education*, vol. 10, no. 2, pp. 26–41, 2018.
[37] C. Papoutsi, A. Drigas, and C. Skianis, "Virtual and augmented reality for developing emotional intelligence skills," *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, vol. 9, no. 3, p. 35, 2021, doi: 10.3991/ijes.v9i3.23939.
[38] E. Mitsea, A. Drigas, and C. Skianis, "VR gaming for meta-skills training in special education: the role of metacognition, motivations, and emotional intelligence," *Education Sciences*, vol. 13, no. 7, p. 639, 2023, doi: 10.3390/educsci13070639.
[39] Z. Z. Elka and W. Zhao, "Problem behaviors in the early childhood o-class: investigating emotional, organizational, and instructional supports," *Early Childhood Education Journal*, 2023, doi: 10.1007/s10643-023-01507-6.
[40] R. Harfiani, Mavianti, and E. Fitri Tanjung, "Practical Application of Inclusive Education Programs in Raudhatul Athfal," *Proceeding International Seminar of Islamic Studies (INSIS)*, vol. 1, no. 1990, pp. 333–339, 2019.
[41] D. Kamińska *et al.*, "Virtual reality and its applications in education: survey," *Information (Switzerland)*, vol. 10, no. 10, p. 318, 2019, doi: 10.3390/info10100318.

[42] L. M. Narikbaeva, "University students' giftedness diagnosis and development," *International Journal of Environmental and Science Education*, vol. 11, no. 17, pp. 10289–10300, 2016.
[43] E. Khalilova and L. Artysheva, "Development of emotional intelligence in children with disabilities," *Scientific Electronic Library*, vol. 14, pp. 372–375, 2020.
[44] C. MacCann, Y. Jiang, L. E. R. Brown, K. S. Double, M. Bucich, and A. Minbashian, "Emotional intelligence predicts academic performance: a meta-analysis," *Psychological Bulletin*, vol. 146, no. 2, pp. 150–186, 2019, doi: 10.1037/bul0000219.
[45] H. M. Alzoubi and R. Aziz, "Does emotional intelligence contribute to quality of strategic decisions? The mediating role of open innovation," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 7, no. 2, p. 130, 2021, doi: 10.3390/joitmc7020130.
[46] R. W. Moeller, M. Seehuus, and V. Peisch, "Emotional intelligence, belongingness, and mental health in college students," *Frontiers in Psychology*, vol. 11, p. 93, Jan. 2020, doi: 10.3389/fpsyg.2020.00093.

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