# The impact of technology and pedagogical support on the development of social intelligence in adolescents

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## Abstract

The development of social intelligence is a delicate issue among teenagers. Insufficient social intelligence leads to social disorientation which may impede students' capacity to grow positively and to understand the reasons for their actions and the logic of the development of complex situations of interpersonal interaction. This study aims to evaluate the technology of pedagogical support in increasing the social intelligence of adolescents in a primary school's educational process. The Mann-Whitney test was used to find differences between subject groups and the Wilcoxon T-test was used to evaluate the social intelligence development programme. The study involved 40 students from Almaty's secondary school no. 76. The social intelligence of adolescents in the school environment was improved through the effective application of technological and pedagogical support in the teaching process. Education policymakers assess the social intelligence of adolescents in their own countries and institutions and make international comparisons.

**Keywords:** Development, Impact, Pedagogical support, Social intelligence, Younger adolescents.

## Contents

> **Contribution of this paper to the literature**
> This study contributes to the existing literature by assessing the effectiveness of the technology of pedagogical support in increasing the social intelligence of younger adolescents in a primary school's educational process.

## 1. Introduction

In recent years, Kazakhstan has focused on improving students' social intelligence to make changes in Kazakhstani society and education. One of the school's main goals is to reform Kazakh education and educating cooperative young people who stand out for their mobility, dynamism and constructiveness. Social intelligence involves the development of a teenager's ability to understand himself, his behavior and the behavior of other people to form effective interactions to solve problems in a timely and constructive manner (Ingram et al., 2019).

It is the duty of any state to provide all children with favorable living, developmental, upbringing and educational conditions and to protect them from violence and abuse. However, violence affects children in their homes, neighborhoods and schools. Parents reported the following as the most prevalent results of cyberbullying for their children: severe stress (55% of respondents), decreased self-esteem (45%), poor academic performance (40%), depression (40%), decreased social activities (35%) and sleep problems (25%). According to a 2019 report by the United Nations Education, Scientific and Cultural Organization (UNESCO), one in every three students worldwide has faced bullying or violence from classmates. According to current research, conflict and disruptive behavior among students have increased over the past decade (Cerit & Şimşek, 2021; Wang, Xiao, Li, & Yao, 2022).

It is necessary to form a comprehensive system for its prevention including legislative changes, the development of effective internal procedures and rules for responding to bullying in the field of educational institutions and methodological recommendations for child protection specialists in issues of prevention and protection against violence in all its manifestations.

Social intelligence development in adolescence is understudied in the literature but it is undeniably socially significant (Nagima et al., 2023; Zhumash et al., 2021). The curriculum content of general educational institutions lacks a coherent system that allows children to continuously develop flexible skills of social behavior and social intelligence in varying degrees of complexity.

The following complex contradictions must be resolved to address the national and educational significance of the issue and the objective need for school support:

- The potentialities contained in pedagogical support and the lack of development of the content and forms of its implementation in the process of social cognition in children of primary school age.
- The need for a purposeful organization of social cognition in primary school and the lack of basic research in our country that reveals the specifics of this process for primary school.
- The objective needs of society for the optimal socialization of younger adolescents and the methodological support available in primary schools are largely fragmented.

These contradictions define the research question which is to find scientific and methodological support for the development of adolescent social intelligence in primary school.

The purpose of this research is to evaluate the technology of pedagogical assistance in enhancing the social intelligence of younger adolescents in the educational process of a primary school. The questions for the study were:

(1) Is it possible to create and use pedagogical support to help younger adolescents develop their social intelligence during the teaching process in a primary school setting?

(2) What are the theoretic and content aspects of the technology of pedagogical support for enhancing social intelligence that determine the effectiveness of school-age social intelligence development?

## 2. Literature Review

The study of social intelligence is an important theoretical task that leads to the disclosure of its features, the identification of components and the description of the relationship between social intelligence and its components with the socio-psychological and psychological characteristics of the individual (Aldridge, McChesney, & Afari, 2018; Berkowitz, Moore, Astor, & Benbenishty, 2017). The practical significance and use of social intelligence in various spheres of human life increase the value of this research. Social intelligence is an important factor in social development and determines the level of personal, social and professional potential of young people (Arseneault, 2018; Esposito, Bacchini, & Affuso, 2019). Young girls and boys should be able to choose their own life path, establish their priorities, recognize themselves as members of society and comprehend themselves, their potential and their purpose in life (Nassar, Shaheen, Saleh, & Arabiat, 2019).

The issue of social intelligence development is currently being examined in the literature (Vila, Gilar-Corbí, & Pozo-Rico, 2021). Different concerns relating to the development of social intelligence were investigated in research that was conceptually comparable to notions such as communicative competence (Fan, Xu, Cao, Zhu, & Zhu, 2022), social competence (Coelho et al., 2023; Salavera, Usán, & Teruel, 2019) and communicative potential (Abrahams et al., 2019; Domitrovich, Durlak, Staley, & Weissberg, 2017).

The definitions of social intelligence share a number of characteristics including:

1. In most approaches, social intelligence is defined as an ability that is associated with a certain activity and is a personal formation.

2. Most researchers consider social intelligence to be separate from general intelligence.

3. The establishment of relationships between events in which the actor is the person himself and his social environment is the subject of these abilities.

Information about various aspects of social intelligence and its development in primary school is relatively scarce. The cognitive aspect of social intelligence presupposes the presence of social knowledge and the possibility of social forecasting for one's development. The emotional aspect or emotional intelligence is an important

component and the basis of social competence. The behavioral aspect of junior high school may be evaluated by the child's adaptation to school life or his maladjustment. All three aspects of social intelligence are interrelated. The main difficulties of a communicative nature include the child's inability to show empathy, difficulties in initiating contact, a lack of a positive attitude towards another person, difficulties in understanding certain social situations and an inability to correctly recognize the context of verbal and non-verbal expressions (Yang, Chan, & Ma, 2020).

The development of social intelligence is the most sensitive issue in early adolescence (Besi & Sakellariou, 2019; Knopp, 2019). Schoolchildren with sufficiently high levels of social intelligence go through this period more smoothly as they gain a better understanding of themselves and those around them. The development of social intelligence affects students' ability to achieve more constructive development.

The pedagogical support of this process is an extremely important and urgent task that acts as a complex technology of support and assists students in effective interaction with peers. The essential characteristic of a holistic technology of pedagogical support is the joint activity of all participants in the educational process which aims to create favorable conditions that contribute to the understanding of the child's social manifestations and the behavior of the people around him in the social adaptation and integration of younger adolescents into society.

## 3. Method

### 3.1. Participants
40 students from Almaty's secondary school No. 76 were randomly assigned to one of two experimental groups to participate in the study. The second group (the CG n = 20) followed the regular training schedule for the class and the first group (the EG n = 20) participated in the authors' pedagogical support.

### 3.2. Instruments
1. "Social Intelligence Test"

We selected this method to assess the level of development of social intelligence and its components because it offers the following benefits: 1) The presence of standards 2) high psychometric characteristics (reliability and validity).3) A wide scope of applications. 4) The possibility of use in a wide age range, starting at nine years. Stimulus material is a set of four test books. Among them, three sub-tests are written for non-verbal stimuli and one is written for verbal stimuli. Each subtest contains 12 to 15 items.

Subtest 1: "Stories with Completion" assesses a student's capacity to anticipate future events and identify the effects of characters' actions in specific situations.

Subtest 2: "Expression groups" determine the subject's ability to make logical generalizations highlighting common essential features in various non-verbal human reactions.

Subtest 3: "Verbal Expression" reveals a person's capacity to comprehend how the meaning of similar verbal responses can change depending on the circumstances that led to them.

Test question 4: "Stories with an addition" demonstrates how the subject can comprehend the reasoning behind how interactional situations develop as well as the significance of people's behavior in these circumstances.

The time for each subtest is limited. The total testing time including instructions is 30-35 minutes.

Testing procedure: The methodology allows for a full battery and the use of separate subtests depending on the objectives of the study. Individual and group testing options are available. Subtests are given in the order of their numbering when using the full version of the method.

Interpretation of results:

The standard score of each sub-test is obtained which reflects the development level of the corresponding learning behavior ability after the result processing procedure is completed.

### 3.3. Procedure
The efficacy of the work is due to the following sequences of the major stages of the experiment: Separate stages have been established focusing on the logic of the experimental cycle. The first stage is connected with the implementation of diagnostic, prognostic and organizational functions. In the second stage, the performing function was realized. The third is the analytical function and the fourth is the function of socialization. These stages can be named preparatory, practical, generalizing and implementation.

The diagnostic function presupposed a meeting with the management team for the analysis of individual experiences and identification of specific difficulties in the school's activities, identification of the educational needs of the teaching staff of the school, formulation of the contradictions of the educational process, statement and substantiation of the problem to find a solution to which the experiment was directed.

An experimental approach was designed to implement prognostic functions such as the purpose of the experiment, idea, design, hypotheses, prediction of expected positive results, consideration of possible negative manifestations, compensatory mechanisms, phase of the experiment, criteria for evaluating the results, etc.

A second meeting with the management team was conducted to discuss the following topics: What are the real conditions for experimenting? What else is required to start the program? Thus, the organizational function was put into practice along with the preparation of the experiment's material base, the distribution of managerial responsibilities, the planning of special training, the experiment's methodological support, etc.

The educational institution's head issued an order enabling the experiment to be carried out at the school after the study was accepted and favorably assessed. In addition, a meeting was held with the primary school teaching staff to familiarized them with the research project. Two groups of study participants were selected after discussions and support for the study. The dates for the program's research and preliminary testing were decided with the teachers.

The assessment tool was used during the pre-test phase in October and November. The development of the teaching technology in paper format was finished after getting in touch with the participants and learning about their needs and desires that they had presented in January.

The instructors of each group notified the participants that they would be tested before and after the research. The technology of the pedagogical support was implemented during the academic study period of the experimental group in February, March and April. The program is intended for 10 lessons which are held twice a week. The duration of each lesson is 45 minutes.

Table 1 shows the theoretic and content aspects of the technology of pedagogical support for adolescents.

**Table 1.** The theoretic and content aspects of the technology of pedagogical support for adolescents.

| | | | | |
|---|---|---|---|---|
| **Purpose:** The improvement of social intelligence and its components of adolescents in the teaching process under the conditions of primary school. | | | | |
| **1** | Participants<br><br>Younger adolescents ⟷ Teachers<br><br>Parents | | Conditions<br>Organization of joint activities<br>Informal communication of participants<br>Use of active methods of work<br>New social group | |
| **2** | Directions of pedagogical support technology | | | |
| | Diagnostics | Consultation | Developmental work | Education |
| | General principles | | | |
| | The principle of the personal approach | The principle of joint activity | The principle of psychological comfort | The principle of empathy and reflection |
| **3** | Methods | | | |
| | Reflection | Modeling | Emotional reaction | Organization of joint activities |
| **4** | Forms | | | |
| | Conversations | Game and training exercises | Creative activities | Training |
| | Content | | | |
| | I myself<br>(Social intelligence as a representation). | I interact<br>(Social intelligence is behavior). | | Me and society<br>(Social intelligence is understanding). |
| **5** | The learning outcome: | Know about the ways of verbal and non-verbal communication.<br>Able to differentiate their emotional states and recognize the emotional states of others by facial expressions, postures, and gestures.<br>They can adapt to various relationships with people (peers, teachers and parents). | | |
| **6** | The criterion for the effectiveness of the implementation of the technology of pedagogical support. | Positive dynamics for the effective development of social intelligence and its components. | | |

We use pedagogical support as a holistic technology that helps organise and create conditions for active interaction between all participants in the educational process (parents, younger adolescents and teachers) for the process of developing social intelligence and its components to be effective. Participants in the process are as follows:

1. Adolescents act as subjects and objects participate in the developmental process. The basis of this process is the personal activity of a teenager aimed at self-development and solving urgent problems facing this age period (dialogue with peers, social adaptation of the individual, the ability to manage their emotions, inclusion in various activities, a constructive way out of the teenage crisis, etc.)
2. Teachers organize and standardize work in various areas of pedagogical support: diagnosis, counseling, development and education. They create conditions for the effective interaction of all participants in the educational process and the personalities of younger adolescents. This theoretical and practical readiness of teachers for the implementation of pedagogical activity using forms, methods and mechanisms of influence.
3. Parents are subjects who have a direct role in the formation and development of the personalities of adolescents contribute to the solution of urgent problems and assist in organizing the educational process and joint activities with the adolescents and the teacher.

Primary school is an environment that creates special conditions for the development of social intelligence.

1. A pedagogical space has been created in which the joint activities of all participants in the process are organized.

2. Communication between a child and an adult is informal.

3. The implementation of active forms and techniques of work that promote interest in the learning process.

4. Adolescents are under conditions of pedagogical support that activate the components of social intelligence related to the cognition of behavior (the ability to distinguish and recognize verbal and non-verbal expressions, feelings and emotions). The decoding, analysis, comparison and creation of the corresponding tables were all performed with the program.

## 4. Findings and Discussion

According to the findings of the social intelligence test (see Figures 1 and 2), there are no appreciable differences in the general structure of social intelligence and its constituent parts between the control group CG and experimental group EG.
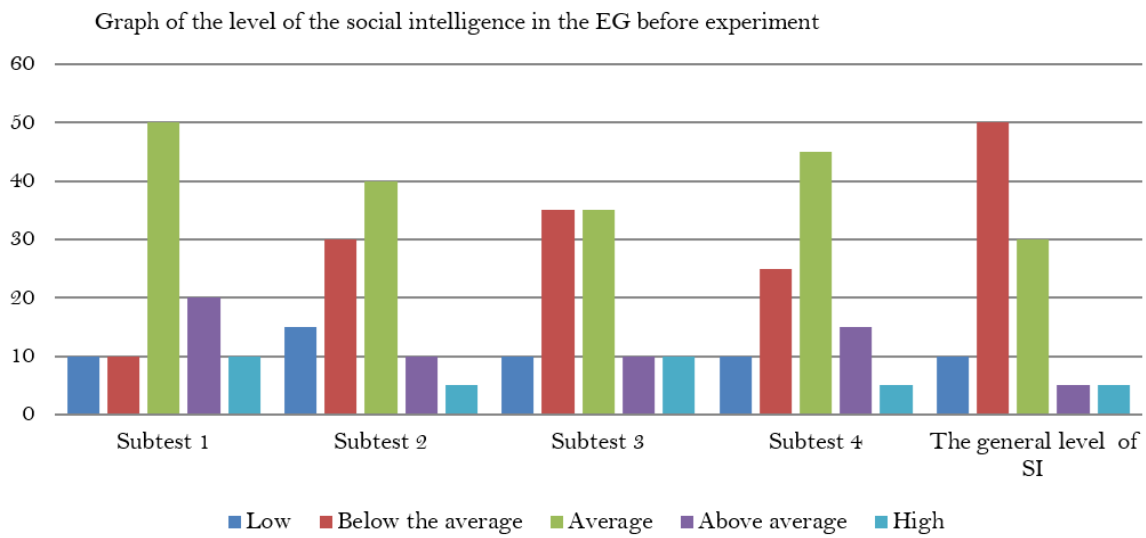
Graph of the level of the social intelligence in the EG before experiment



**Figure 1.** Percentage distribution of subjects in the EG according to the level of social intelligence and its components.

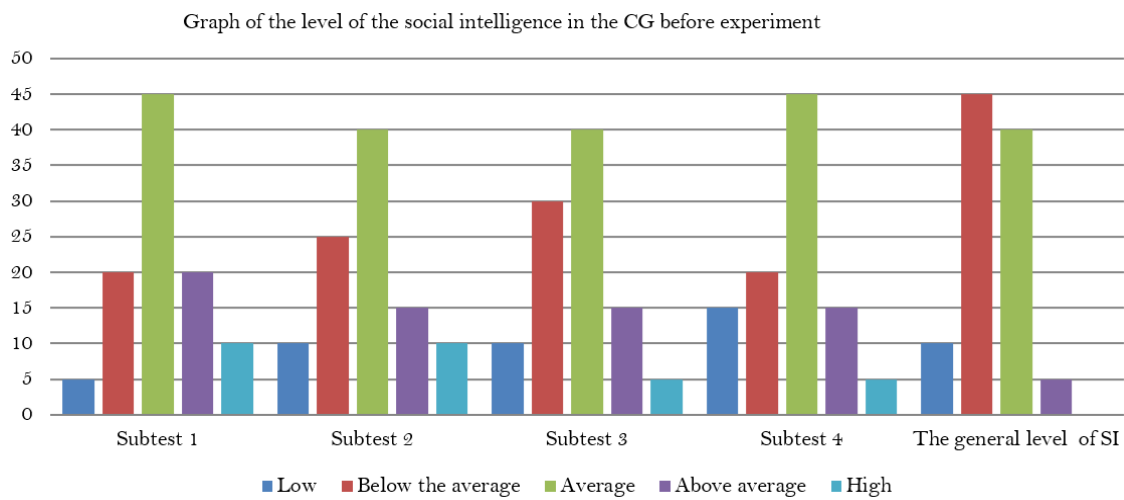Graph of the level of the social intelligence in the CG before experiment



**Figure 2.** Percentage distribution of subjects in the CG according to the level of social intelligence and its components.

Methods of mathematical statistics such as the U-test and Mann-Whitney Table 2 were used to give an in-depth review of the data acquired and to discover differences between groups of subjects.

**Table 2.** Differences in indicators of social intelligence between groups of subjects according to the Mann-Whitney U-criterion (after experiment).

| Indicators | Average rank | | U – criterion | Significance level |
|---|---|---|---|---|
| Method | EG | CG | Mann–Whitney | p |
| Subtest 1 | 23.48 | 23.48 | 140.50 | 0.077 |
| Subtest 2 | 25.05 | 25.05 | 106.50 | 0.009 |
| Subtest 3 | 23.15 | 23.15 | 147.00 | 0.123 |
| Subtest 4 | 25.43 | 25.43 | 101.50 | 0.009 |
| General social intelligence | 23.03 | 23.03 | 149.50 | 0.126 |

The following is an interpretation of the U-test results: Subtest 1: The U-test is 0.077. The critical value of the U test for a given number of comparison groups is $0.077 > 0.05$. Therefore, differences in trait levels among comparison groups are not statistically significant ($p > 0.05$).

For a given number of comparison groups, the critical value of the U test is $0.009 < 0.05$. Therefore, a difference in the comparison group for this level of the trait is statistically significant ($p < 0.05$).

Subtest 3: The U-test is 0.009. The critical value of the U test for a given number of comparison groups is $0.123 > 0.05$. Therefore, the difference at this level of the trait among the comparison groups is not statistically significant ($p > 0.05$).

Subtest 4: The U-test is 0.005. The critical value of the U test is $0.009 < 0.05$ for a given number of comparison groups. Therefore, the difference in trait level among the comparison groups is statistically significant ($p < 0.05$).

In terms of general social intelligence, the U-test is 0.126. The cut-off value of the U test for a given number of comparison groups is $0.126 > 0.05$. Therefore, differences in trait levels among comparison groups are not statistically significant ($p > 0.05$).

We used the method of mathematical statistics to assess the effectiveness of the implementation of the program for the development of social intelligence in adolescent children (see Tables 3 and 4).

**Table 3.** Differences in indicators of the Wilcoxon T-test in the EG.

| Method indicators | Number of | Meaning | Meaning | Significance level |
|---|---|---|---|---|
| before and after the experiment | Participants | T | Z | p-level |
| Subtest 1 | 20 | 0 | 1.604 | 0.109 |
| Subtest 2 | 20 | 0 | 2.666 | 0.008 |
| Subtest 3 | 20 | 0 | 1.666 | 0.108 |
| Subtest 4 | 20 | 0 | 2.366 | 0.008 |
| General social intelligence | 20 | 20 | 0.296 | 0.767 |

**Table 4.** Differences in indicators of the Wilcoxon T-test in the CG.

| Method indicators before and after the experiment | Number of Participants | Meaning T | Meaning Z | Significance level p-level |
|---|---|---|---|---|
| Subtest 1 | 20 | 2 | 0.535 | 0.593 |
| Subtest 2 | 20 | 2,5 | 2.666 | 0.361 |
| Subtest 3 | 20 | 6 | 1.666 | 0.686 |
| Subtest 4 | 20 | 2 | 2.366 | 0.593 |
| General social intelligence | 20 | 2 | 0.296 | 0.593 |

The Wilcoxon T-test findings are interpreted as follows: Subtest 2. The U-test is 0.008. The critical value of the U test for a given number of comparison groups is 0.008< 0.05. Therefore, a difference in the comparison group for this level of the trait is statistically significant (p < 0.05).

Subtest 4's U-test is 0.008.The critical value of the U test for a given number of comparison groups is 0.008 < 0.05. Therefore, a difference in the comparison group for this level of the trait is statistically significant (p < 0.05).

We can infer from a quantitative evaluation of the Wilcoxon T-criterion that the control group's indicators have not changed significantly as a result of the application of the technology of pedagogical support. Changes in subtests 2 and 4 are noticeable in the experimental group depending on the significance level.

According to the results of subtest No. 1 in the experimental group, there are no significant changes in this subtest but there is a positive trend in improving performance. According to the first measurement, indicators with results below average were found in 15% of adolescents and after it became 10% which is 5% lower which shows a positive trend. Average scores for indicators before and after control measurements were found in 50% of adolescents. These indicators remained unchanged. Indicators with results above average were identified before the control measurement in 20% of adolescents and after the control measurement; it became 25% which is 5% higher indicating an improvement in results on this subtest. High scores before and after the control measurement were found in 15% of adolescents; these indicators also remained unchanged.

According to the results of subtest No.2, it revealed a difference. In the results of the formative experiment, adolescent children with low scores were 15% and became 5% which shows a positive trend of 10% with results below the average, it was 30% and became 20% with average indicators, it was 40% and became 50%, i.e., the results improved by 10% with indicators above the average, it was 10%, and after it became 25%, i.e., the indicators improved by 15%. We may conclude from the findings that adolescents begin to better comprehend people's emotions, sentiments and intentions through facial expressions, postures, and gestures hence improving their capacity to understand others.

In the results of subtest 3, no differences were found among the primary and control measurements but there was a positive trend towards improved performance. Adolescents with low scores were 10% after training sessions on developing social intelligence became 5% which indicates an improvement in performance by 5% with a level below the average of 25% and after the control measurement, it became 20% which indicates an improvement in dynamics by 5%. Indicators of the average level were observed in 35% of adolescents, then they became 40%, i.e., improved by 5%. With indicators below the average, it was 10%, and then it became 15% which indicates an improvement in results by 5%. Children with high rates were 10%, these rates remained unchanged.

According to the results of subtest No. 4, significant changes were revealed with indicators between the primary and control measurements. Participants with low scores before the formative experiment were 10%. The results improved by 5% with indicators below the average, it was 25% which shows a positive trend of 5%. Averages improved by 5%. Indicators above the average were 15%, they became 30% which indicates a significant change of 15%. According to the research, adolescents begin to see the objectives and purposes of communication participants and can predict the consequences of their actions through linguistic manifestations (facial expressions, postures, and gestures). The ability to regulate behavior in society has also developed and as a result, adolescents have begun to better adapt to various kinds of relationships between people (peers, parents and teachers).

When assessing the overall level of development, no significant differences were found but positive indicators were present. According to the results of the initial measurement of younger adolescents with low scores, there were 10% of children after the control measurement; it became 5%, i.e., the results improved by 5%. The difference is 5% with average scores of 35% of adolescents; it became 40% which indicates an improvement in results by 5% with results above the average. Hence, in the experimental group, significant positive changes have been demonstrated in subtests 2 and 4. According to the results of subtests 1 and 3 as well as the level of development of general social intelligence, positive dynamics can be recognized. In the experimental group, significant positive changes were shown in subsets 2 and 4. According to the results of subtests 1 and 3 as well as the level of development of general social intelligence, positive dynamics can be identified. In the control group, no subtest changes were discovered.

## 5. Conclusion

We validated our hypothesis throughout the course of this study. There was a considerable improvement in social intelligence in adolescents who received specially planned instruction on current pedagogical support technology under primary school circumstances. The primary practical application of this research is to create and implement pedagogical support technology to help adolescents develop their social intelligence during the teaching process in a primary school setting. We employ pedagogical assistance as a comprehensive technology when dealing with adolescents with the goal of creating conditions in primary school for the successful development of social intelligence and its components. The technology has been used in four directions: diagnostics, consultation, education and developmental work. A program for the development of social intelligence was implemented which included 10 lessons aimed at solving specific problems to expand the understanding of the ways of verbal and non-verbal communication of adolescents and to regulate their behavior depending on the context and situation of the relationship which contributes to various relationships with people. In addition, pedagogical support allowed the development of the joint activity of all participants in the educational process to create favorable conditions that contribute to the understanding of the child's social manifestations. Thus, the control phase of the study showed

that adolescents who participated in the program for the development of social intelligence compared with the group of those who did not participate in the program had significant dynamics of indicators of social intelligence. They developed their abilities in understanding other people's emotions and non-verbal manifestations of interlocutors, developed the ability to interpret their feelings, arbitrarily manage their emotions, be farsighted and flexible in communication, adequately respond to criticism and provocative behavior, refuse someone else's request, set up and maintain contacts with others and became more beneficent and sincere which created conditions for more successful socialization.

## 6. Limitations and Additional Future Directions

This study evaluated the technology of pedagogical support in increasing the social intelligence of adolescents during the primary school learning process. It proved that the social intelligence of adolescents in the school environment improved through the effective application of technological and pedagogical support in the teaching process. Education policymakers can assess the social intelligence of adolescents in their own countries and schools and make international comparisons with the help of these findings. The results of this study do not provide comprehensive solutions to this complex and multifaceted problem. Many of its aspects need further study.

1. Future researchers could study the main theoretical approaches to the interpretation of the concepts of social intelligence and interpersonal interaction as the problem of their study.

2. Additional methodological work should be carried out to determine the psychological diagnostics tools that will allow us to adequately identify the relationship between social intelligence and interpersonal interaction.

3. It is expedient to conduct research to determine social intelligence in individuals (on the example of university graduates) and study the features of the relationship between social intelligence and interpersonal interaction.

4. It is important and relevant to single out the formation of social intelligence in the course of studying at a university since social intelligence is a social characteristic and a personal neoplasm of students.

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