

Characteristics of Interpersonal Communication Among Primary School Students in Different Educational Systems

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ABSTRACT

Background. The interpersonal communication skills of students play a crucial role in preventing aggression, bullying, and fostering a psychologically safe educational environment. However, schools often lack the time and resources to focus on the deliberate cultivation of such skills. Simultaneously, many educational systems — particularly Waldorf pedagogy and the Elkonin-Davydov developmental system — presuppose an organization of content, methods, and forms of instruction through which interpersonal interaction skills should be automatically developed.

Objective. To compare the characteristics of primary school students' interpersonal communication across different educational systems: the Elkonin-Davydov developmental system, the traditional system of education, and Waldorf pedagogy.

Design. The sample comprised 62 Russian fourth-grade students (56.5% boys, mean age $M_{age} = 10.7$), enrolled in different systems of instruction — traditional, Elkonin-Davydov, and Waldorf. To examine the characteristics of small groups (their structure, intragroup relations, presence of conflicts, cohesion, status, and informal leadership), Moreno's sociometric test was administered. To assess the communicative skills of students, the "Conflict" technique was employed (designed by K. Polivanova, I. Rivina, I. Ulanovskaya).

Results. The findings demonstrated that the characteristics of the interpersonal communication of students differed substantially across the three pedagogical systems. It was found that students enrolled in the Elkonin-Davydov developmental system exhibited significantly higher levels of mutual attraction (coefficient of mutual attraction = 64%) within their classroom, and this class also demonstrated the most favorable socio-psychological climate compared to classrooms utilizing the Waldorf and traditional systems of education. Additionally, significant differences in the effectiveness of group work were identified across the three classrooms. Students from both the Elkonin-Davydov developmental system and Waldorf pedagogy demonstrated higher performance in group work compared to students from the traditional system of education. Furthermore, the findings revealed that the Waldorf pedagogical system exhibited contradictory results: high effectiveness in

group work coupled with pronounced status polarization based on sociometric analysis — a high proportion of “stars” (23%) and isolated students (23%).

Conclusion. Despite the limited sample size, the study demonstrated that the most favorable conditions for the interpersonal communication of students are created within the Elkonin-Davydov developmental system. The Waldorf pedagogical system exhibits contradictory results: high effectiveness in group work coupled with pronounced status polarization. The traditional system requires modernization with an emphasis on developing educational dialogue with peers and with teachers.

Keywords: Interpersonal communication; traditional education; Elkonin-Davydov developmental system; Waldorf pedagogy; dialogic communication; cooperation

Highlights:

- The most favorable socio-psychological climate was observed in the classroom utilizing the Elkonin-Davydov developmental system of education. In the traditional system, an average level of relational well-being was identified, characterized by neutral-passive connections, whereas in the Waldorf system, pronounced status polarization was evident
- Students in the Elkonin-Davydov and Waldorf pedagogy systems demonstrate higher effectiveness in group problem-solving compared to students from the school with a traditional educational system
- In classrooms with the Elkonin-Davydov developmental system and the traditional educational program, intellectual leaders were identified who constitute the “core” of the class — that is, they form the most popular group of students. Conversely, in the classroom from the school utilizing the Waldorf system of education, such a phenomenon of student leadership could not be identified
- The pedagogical system exerts a decisive influence on the nature of students’ interpersonal interaction

АННОТАЦИЯ

ОСОБЕННОСТИ МЕЖЛИЧНОСТНОГО ОБЩЕНИЯ МЛАДШИХ ШКОЛЬНИКОВ В РАЗНЫХ СИСТЕМАХ ОБУЧЕНИЯ

Актуальность. Навыки межличностного общения учеников играют ключевую роль в профилактике агрессии, буллинга и создания психологически безопасной образовательной среды. Однако в школах зачастую нет ни времени, ни возможностей уделять внимание формированию таких навыков. При этом многие образовательные системы (в частности, система Вальдорфской педагогики и система Д.Б. Эльконина–В.В. Давыдова) предполагают такую организацию содержания, методов и форм обучения, при которой автоматически должны формироваться и навыки межличностного взаимодействия.

Цель. Сопоставить особенности межличностного общения в разных системах обучения: в системе Д.Б. Эльконина–В.В. Давыдова, в традиционной системе обучения и в системе Вальдорфской педагогики.

Дизайн. Выборку составили 62 российских школьника 4-х классов (56,5% мальчиков, средний возраст ($M_{age} = 10,7$), обучающихся по разным системам обучения — традиционной, Д.Б. Эльконина–В.В. Давыдова и Вальдорфской. С целью изучения особенностей малых групп (их структуры, внутригрупповых связей, наличия конфликтов, сплоченности, статуса, неформального лидерства) был проведен социометрический тест Я. Морено. Для оценки коммуникативных умений учащихся использовалась методика «Конфликт» К.Н. Поливановой, И.В. Ривинной и И.М. Улановской.

Результаты. Было показано, что особенности межличностного общения учащихся существенно различаются в разных педагогических системах. Было обнаружено, что ученики, обучающиеся по системе Д.Б. Эльконина–В.В. Давыдова, демонстрируют значимо более высокий уровень взаимной симпатии ($KV = 64\%$) в классе, и в этом же классе был наиболее благоприятный социально-психологический климат по сравнению с классами, обучающимися по Вальдорфской и традиционной системам обучения. Также были выявлены значимые различия в эффективности групповой работы в трех классах. Учащиеся из системы Д.Б. Эльконина–В.В. Давыдова и системы Вальдорфской педагогики продемонстрировали более высокую результативность при работе в группе по сравнению с учащимися из школы с традиционной системой обучения. Было также показано, что Вальдорфская педагогическая система демонстрирует противоречивые результаты: высокую эффективность групповой работы при выраженной статусной поляризации по социометрии — высокая доля «звезд» — 23% и «изолированных» учащихся — 23%.

Выводы. Несмотря на ограниченный объем выборки, исследование показало, что наиболее благоприятные условия для межличностного общения создаются в системе Д.Б. Эльконина–В.В. Давыдова. Вальдорфская педагогическая система демонстрирует противоречивые результаты: высокую эффективность групповой работы при выраженной статусной поляризации. Традиционная система требует модернизации с акцентом на развитие учебного диалога со сверстниками и с учителем.

Ключевые слова: Межличностное общение; младшие школьники; традиционное обучение; система Д.Б. Эльконина–В.В. Давыдова; Вальдорфская педагогика; диалогичное общение; сотрудничество

Ключевые положения:

- Наиболее благоприятный социально-психологический климат наблюдается в классе с системой обучения Д.Б. Эльконина–В.В. Давыдова. В традиционной системе выявлен средний уровень благополучия взаимоотношений с нейтрально-пассивными связями, а в Вальдорфской системе — выраженная поляризация статусов.
- Обучающиеся по системе Д.Б. Эльконина–В.В. Давыдова и системе Вальдорфской педагогики демонстрируют более высокую результативность групповых решений по сравнению с обучающимися по традиционной системе обучения.
- В классах с системой Д.Б. Эльконина–В.В. Давыдова и традиционной системой имеются интеллектуальные лидеры, которые составляют «ядро» класса, то есть являются самой популярной группой учащихся. В классе же с Вальдорфской системой обучения подобного феномена лидерства учащихся не выявлено
- Образовательная система оказывает ключевое влияние на характер межличностного взаимодействия учащихся

RESUMEN

CARACTERÍSTICAS DE LA COMUNICACIÓN INTERPERSONAL EN ESTUDIANTES DE PRIMARIA EN DIFERENTES SISTEMAS EDUCATIVOS

Antecedentes. Las habilidades de comunicación interpersonal de los estudiantes desempeñan un papel crucial en la prevención de la agresión, el bullying y en el fomento de un entorno educativo psicológicamente seguro. Sin embargo, las escuelas a menudo carecen del tiempo y los recursos para centrarse en el cultivo deliberado de dichas habilidades. Simultáneamente, muchos sistemas educativos — particularmente la pedagogía Waldorf y el sistema de enseñanza desarrollante de Elkonin-Davydov — presuponen una organiza-

ción de contenidos, métodos y formas de instrucción a través de los cuales las habilidades de interacción interpersonal deberían desarrollarse automáticamente.

Objetivo. Comparar las características de la comunicación interpersonal de estudiantes de primaria en diferentes sistemas educativos: el sistema de enseñanza desarrollante de Elkonin-Davydov, el sistema de educación tradicional y la pedagogía Waldorf.

Diseño. La muestra estuvo compuesta por 62 estudiantes rusos de cuarto grado (56.5% niños, edad media $M_{\text{edad}} = 10.7$ años), matriculados en diferentes sistemas de instrucción —tradicional, Elkonin-Davydov y Waldorf. Para examinar las características de los grupos pequeños (su estructura, relaciones intragrupales, presencia de conflictos, cohesión, estatus y liderazgo informal), se administró el test sociométrico de Moreno. Para evaluar las habilidades comunicativas de los estudiantes, se empleó la técnica «Conflicto» (diseñada por K. Polivanova, I. Rivina, I. Ulanovskaya).

Resultados. Los hallazgos demostraron que las características de la comunicación interpersonal de los estudiantes diferían sustancialmente entre los tres sistemas pedagógicos. Se encontró que los estudiantes matriculados en el sistema de enseñanza desarrollante de Elkonin-Davydov exhibían niveles significativamente más altos de atracción mutua (coeficiente de atracción mutua = 64%) dentro de su aula, y esta clase también demostró el clima sociopsicológico más favorable en comparación con las aulas que utilizaban los sistemas Waldorf y tradicional de educación. Además, se identificaron diferencias significativas en la eficacia del trabajo grupal entre las tres aulas. Los estudiantes tanto del sistema de enseñanza desarrollante de Elkonin-Davydov como de la pedagogía Waldorf demostraron un mayor rendimiento en el trabajo grupal en comparación con los estudiantes del sistema de educación tradicional. Adicionalmente, los hallazgos revelaron que el sistema pedagógico Waldorf presentó resultados contradictorios: una alta eficacia en el trabajo grupal junto con una pronunciada polarización de estatus basada en el análisis sociométrico — una alta proporción de «estrellas» (23%) y estudiantes aislados (23%).

Conclusión. A pesar del tamaño limitado de la muestra, el estudio demostró que las condiciones más favorables para la comunicación interpersonal de los estudiantes se crean dentro del sistema de enseñanza desarrollante de Elkonin-Davydov. El sistema pedagógico Waldorf presenta resultados contradictorios: alta eficacia en el trabajo grupal junto con una pronunciada polarización de estatus. El sistema tradicional requiere una modernización con énfasis en el desarrollo del diálogo educativo con los compañeros y con los docentes.

Palabras clave: Comunicación interpersonal; educación tradicional; sistema de enseñanza desarrollante de Elkonin-Davydov; pedagogía Waldorf; comunicación dialógica; cooperación

Aspectos destacados:

- El clima sociopsicológico más favorable se observó en el aula que utilizaba el sistema de enseñanza desarrollante de Elkonin-Davydov. En el sistema tradicional, se identificó un nivel medio de bienestar relacional, caracterizado por conexiones neutro-pasivas, mientras que en el sistema Waldorf era evidente una pronunciada polarización de estatus.
- Los estudiantes en los sistemas de Elkonin-Davydov y pedagogía Waldorf demuestran una mayor eficacia en la resolución de problemas grupales en comparación con los estudiantes de la escuela con un sistema educativo tradicional.
- En las aulas con el sistema de enseñanza desarrollante de Elkonin-Davydov y el programa educativo tradicional, se identificaron líderes intelectuales que constituyen el «núcleo» de la clase — es decir, forman el grupo de estudiantes más popular. Por el contrario, en el aula de la escuela que utiliza el sistema educativo Waldorf, no se pudo identificar dicho fenómeno de liderazgo estudiantil.
- El sistema pedagógico ejerce una influencia decisiva en la naturaleza de la interacción interpersonal de los estudiantes.

RESUME**CARACTERISTIQUES DE LA COMMUNICATION INTERPERSONNELLE DES ELEVES DU PRIMAIRE DANS DIFFERENTS SYSTEMES EDUCATIFS**

Origines. Les compétences en communication interpersonnelle des élèves jouent un rôle clé dans la prévention de l'agressivité, des brimades et dans la création d'un environnement éducatif psychologiquement sûr. Cependant, les écoles manquent souvent de temps et de ressources pour développer ces compétences. Par ailleurs, de nombreux systèmes éducatifs (notamment la pédagogie Waldorf et le système Elkonin-Davydov) supposent une organisation des contenus, des méthodes et des formes d'enseignement qui favorise automatiquement le développement des compétences d'interaction interpersonnelle.

Objectif. Comparer les caractéristiques de la communication interpersonnelle dans différents systèmes éducatifs : le système Elkonin-Davydov, le système traditionnel et la pédagogie Waldorf.

Méthode. L'échantillon comprenait 62 élèves russes de quatrième année (56,5 % de garçons, âge moyen $M_{age} = 10,7$), scolarisés selon différents systèmes éducatifs : traditionnel, Elkonin-Davydov et Waldorf. Afin d'étudier les caractéristiques des petits groupes (structure, relations intra-groupe, présence de conflits, cohésion, statut, leadership informel), un test sociométrique de J. Moreno a été utilisé. Pour évaluer les compétences communicationnelles des élèves, la méthode « Conflit » de K.N. Polivanova, I.V. Rivina et I.M. Ulanovskaïa a été appliquée.

Résultats. Il a été démontré que les caractéristiques de la communication interpersonnelle des élèves diffèrent significativement selon les systèmes pédagogiques. Les élèves du système Elkonin-Davydov présentent un niveau significativement plus élevé de sympathie mutuelle (le coefficient de réciprocité = 64 %) au sein de la classe, et ce groupe présente également le climat socio-psychologique le plus favorable par rapport aux classes Waldorf et traditionnelles. Des différences significatives ont également été observées dans l'efficacité du travail de groupe entre les trois classes. Les élèves des systèmes Elkonin-Davydov et Waldorf ont montré de meilleurs résultats en travail de groupe que ceux du système traditionnel. Il a également été constaté que le système Waldorf présente des résultats contradictoires : une forte efficacité du travail de groupe combinée à une polarisation statutaire marquée selon la sociométrie — proportion élevée « des stars » (23 %) et d'élèves « isolés » (23 %).

Conclusion. Malgré la taille limitée de l'échantillon, l'étude montre que les conditions les plus favorables à la communication interpersonnelle sont créées dans le système Elkonin-Davydov. Le système Waldorf présente des résultats ambivalents : une forte efficacité du travail de groupe accompagnée d'une polarisation statutaire. Le système traditionnel nécessite une modernisation mettant l'accent sur le développement du dialogue éducatif entre pairs et avec l'enseignant.

Mots-clés: Communication interpersonnelle; élèves du primaire; enseignement traditionnel; système Elkonin-Davydov; pédagogie Waldorf; communication dialogique; coopération

Points principaux:

- Le climat socio-psychologique le plus favorable est observé dans la classe du système Elkonin-Davydov. Le système traditionnel montre un niveau moyen de bien-être relationnel avec des liens neutres-passifs, tandis que le système Waldorf présente une polarisation marquée des statuts.
- Les élèves des systèmes Elkonin-Davydov et Waldorf démontrent une meilleure efficacité dans la prise de décisions en groupe que ceux du système traditionnel.
- Dans les classes des systèmes Elkonin-Davydov et traditionnel, on observe des leaders intellectuels constituant le « noyau » de la classe, c'est-à-dire le groupe le

plus populaire d'élèves. Ce phénomène de leadership n'a pas été observé dans la classe Waldorf.

- Le système éducatif exerce une influence déterminante sur la nature des interactions interpersonnelles des élèves.

Introduction

Interpersonal communication with peers constitutes a distinct and crucial aspect of students' school life of students. The nature of a student's relationships with peers determines their status within the group (Moskvina, 2017; Rubin et al., 2006; Zuckerman, 1993) and forms a foundation for academic achievement (Tejpordei et al., 2023; Wentzel, 2005), emotional well-being, and social adaptation (Kapustina & Ignatovich, 2022; Ladd, 1999; Walker, 2004). It is within the school environment that a student's communicative skills are fundamentally shaped, and a specific style of interaction is developed. Thus, interpersonal relationships function as a unique factor influencing the formation of the child's personality.

The problem of developing effective interpersonal communication skills among students in educational practice remains one of the most pressing issues and, simultaneously, an insufficiently developed area within the traditional educational system. An emphasis on knowledge transmission at the expense of communicative skill development leads to a deficit in adequate interpersonal communication among students, which, in turn, constrains not only their social adaptation but also their cognitive development (Zuckerman, 2020; Rubtsov, 2024). In contrast to this approach, there exist alternative systems of education — such as the Elkonin–Davydov system, Waldorf pedagogy, cooperative learning pedagogy, the school of dialogue of cultures, and the Montessori system — that emphasise the importance of interpersonal interaction as a fundamental foundation for organising the educational process. These systems are grounded in the understanding that learning is a dynamic process, unfolding within conditions of genuine dialogue, cooperation, and collaborative activity among all its participants.

Despite the recognised correlation between effective interpersonal communication and the quality of learning (Aisyah et al., 2024; Chukwu, 2025; Rubtsov, 2024), many educational institutions continue to experience persistent difficulties in integrating the principles of effective communication into their curricula. In this context, educational systems where interpersonal communication is inherently integrated into the learning process, such as the Elkonin-Davydov system and Waldorf pedagogy, are of particular interest. Both systems are founded on a specific form of educational collaboration among children, characterised by a sense of community, mutual belonging, and shared purpose, while simultaneously preserving each child's individuality.

A Comparative Analysis of Interpersonal Communication Features across Different Educational Systems

The traditional educational system, based predominantly on the transmission of ready-made knowledge from teacher to student, is characterised by a hierarchical

model of interaction, where the main focus is on individual academic achievement. Under such conditions, interpersonal communication among students often becomes situational, confined to the boundaries of academic tasks, and does not receive deliberate pedagogical support. This can result in insufficient development of skills in cooperation, mutual assistance, and emotional understanding among students. Moreover, the patterns of interaction and content of communication that are established within groups in traditional schools exist as separate tasks — that is, disconnected from the subject matter for which this communication is structured (Rubtsov & Ulanovskaya, 2021). Consequently, under such conditions, the capacity for dialogical communication, cooperation with peers, and reflection remains comparatively low (Ilyin, 2009; Rubtsov et al., 2021; Zimnyaya, 2005).

In the **Elkonin-Davydov developmental system**, primary attention is devoted to the formation of theoretical concepts and general modes of action, which necessarily presupposes collaborative educational activity in solving academic tasks and, within this framework, educational collaboration. Here, interpersonal communication functions not merely as an accompanying factor but is deliberately integrated into the learning process as its essential component. Collaborative problem-solving and work in pairs and groups facilitate the development of communicative and cooperative skills, enhance the effectiveness of learning, increase the level of responsibility for collective outcomes, and promote the formation of students' social competence and reflection (Rubtsov & Ulanovskaya, 2021; Rubtsov, 2024). Furthermore, the engagement of students in learning is heightened through the implementation of educational dialogue and the construction of dialogue during classroom instruction.

In the Elkonin-Davydov developmental system, the teacher organises forms of group work in which students exchange opinions, actions, and collectively monitor and evaluate one another, because in the Elkonin-Davydov system, the development of the student as a subject of educational activity occurs within the very process of the formation of educational activity itself (Zuckerman, & Obukhova; Rubtsov, 2005). At the initial stage, the student carries out educational activity together with other students and with teacher support — that is, educational activity is performed by a collective subject, and it is precisely in these situations that zones of proximal development emerge (Sivashinskaya & Punchik, 2010). Research demonstrates that students from schools implementing the Elkonin-Davydov system exhibit a more reflective stance during group work and more frequently achieve correct solutions in collaborative tasks (Rubtsov & Ulanovskaya, 2021). This can be explained by the fact that students actively employ such mechanisms as constructive feedback, active listening and mutual respect, and consideration of the perspectives of partners, which transforms the educational process into educational dialogue with peers and with teachers.

Waldorf pedagogy, which belongs to the category of person-centered educational approaches, emphasises not only intellectual development but also the harmonious development of the emotional, physical, and spiritual dimensions of the child's personality (Steiner, 1997). Here, interpersonal communication is viewed as the foundation for community formation, where students learn to live and work within an atmosphere of trust, mutual respect, and support (Mantilla, 2007; Selfors,

2024; Valeev, 2006). Students spend several years of their education within the same collective under the guidance of a single teacher, which facilitates the formation of stable social bonds and promotes deep understanding of the individual characteristics of each group member. Such an approach creates a unique educational environment where the process of learning is organically integrated with the cultivation of social responsibility and appreciation for the value of others. However, this system also has certain limitations. Specifically, the emphasis on individual student development may restrict collective forms of interaction, despite the creation of a favourable environment for interpersonal communication within the group (Dahlin, 2007). Nevertheless, Waldorf pedagogy represents a valuable approach to the realisation of humanistic principles in education, demonstrating alternative pathways for personal development grounded in principles of wholeness, continuity, and respect for the individual pace of child development (Kartashova, 2020).

Significant differences are evident in the interpersonal communication styles of students across different pedagogical systems.

The traditional educational system, characterised by a predominantly authoritarian and monological style of interaction, is defined by subject-object relationships. In this framework, the teacher is positioned as the primary source of knowledge and controlling authority, while the student assumes the role of a passive recipient of information. Communication is primarily directive, focusing on the acquisition of subject matter rather than on developing communicative skills during the learning process. This approach limits opportunities for the free exchange of opinions and hinders the development of social competencies, including skills in argumentation, discussion, and cooperation. Consequently, patterns of dependence, submission, and uncertainty during interpersonal interactions are reinforced. Students often struggle not only to establish constructive peer relationships but also to engage in productive dialogue with educators, which adversely affects both their academic motivation and socio-emotional development (Sanina & Rastorgueva, 2023).

In contrast, the Elkonin-Davydov developmental education system and humanistically oriented approaches like Waldorf pedagogy are grounded in a subject-subject model of communication. This model presupposes students' active engagement in the learning process, where interpersonal interaction is built on dialogue, cooperation, mutual respect, and — as exemplified in Waldorf schools — the recognition of each individual's inherent value. Such an environment significantly broadens opportunities for developing critical thinking, initiative, reflection, and academic autonomy. Students form sustained communicative competencies: the ability to negotiate, listen actively, articulate and defend a viewpoint, consider diverse perspectives, and collaborate effectively in groups (Zuckerman, 1993; Polyakova, 2009).

Furthermore, the Elkonin-Davydov system involves a deliberate focus on fostering learning cooperation. Here, students learn not only to solve academic tasks collectively but also to regulate group interactions, distribute roles, and jointly establish norms for engagement. This focus is particularly vital in light of contemporary demands for flexible skills, including communication, teamwork, creativity, and emotional intelligence (Zaitseva & Korotaeva, 2017; Evseeva & Pozdeyeva, 2024).

Consequently, contemporary educational practice should strive toward the integration of elements of dialogical interaction and cooperation into the learning process, even within the framework of the traditional classroom-based system. This will enable the creation of conditions under which interpersonal communication among students becomes not only an instrument for the mastery of academic content but also an important factor in their personal, social, and emotional development.

Methods

The primary objective of the study was to compare the characteristics of interpersonal communication across three distinct educational systems: the Elkonin–Davydov developmental system (DE), the traditional system of education (TS), and Waldorf pedagogy (WP).

We hypothesised that classes implementing the Elkonin–Davydov developmental system (DE) and Waldorf pedagogy (WP) would demonstrate higher levels of group cohesion, more pronounced cooperative behaviours among students, and greater effectiveness in group problem-solving compared to their counterparts in the traditional educational system (TS).

Research Questions

1. To what extent do the educational systems differ in terms of group cohesion at the socio-emotional level?
2. What are the differences in task-solving effectiveness between individual and collaborative group work across the educational systems?
3. How do the systems differ in children's propensity for collaborative work, as evidenced by the level of coordination among group members?

Questionnaires

Moreno's Sociometric Test

The sociometric assessment was conducted in three stages, each designed to elicit choices based on a distinct motive. The first scenario targeted socio-emotional motives within the learning context. The second, interpersonal motives unrelated to academic collaboration (choosing a "leisure companion". The third, academic-task-oriented motives (Moreno, 1958). Accordingly, students were presented with three sociometric questions: one from the academic domain ("If your class were to be re-organised, with whom would you prefer to continue studying in a new group?"); a second from the leisure domain ("Who from your class would you invite to your birthday party?"); and a third from the domain of academic tasks ("Who would you choose to sit next to during a challenging test?").

The selection criterion was the student's desire to engage in a joint activity with a classmate. The more group members chose a particular classmate for collaborative work, the more popular that student was considered, and the higher their sociometric

status. The instrument used for the assessment was a standard sociometric questionnaire. Responses for each question were limited to three classmates¹.

During the administration of the survey, the researcher ensured that participants did not communicate with one another and repeatedly emphasised the mandatory nature of completing all items. Visual contact between participants was not prevented.

Based on the collected data, a score was calculated for each participant — the number of “choices” received for collaborative activity — indicating their relative position within the peer group. Students were then classified into one of four status categories based on their number of positive choices for them: «stars» (>5 choices), “preferred” (3–5 choices), “accepted” (1–2 choices), and “isolated” (0 choices). This categorisation enabled the calculation of the group cohesion index and the coefficient of psychological reciprocity, which served as quantitative indicators of the structure of interpersonal relationships within the classroom.

The “Conflict” Technique

The “Conflict” technique (Polivanova et al., 2013) is used to assess the level of development of collaborative action abilities in primary school graduates, as well as students’ readiness to constructively resolve conflicts through cooperation, which is a key component of effective interpersonal communication in the educational environment. The assessment of “jointness” — the children’s capacity for meaningful collaborative interaction in solving learning tasks, constructively overcoming disagreements, and coordinating individual positions to achieve a common group solution — is carried out by comparing the effectiveness of individual and group solutions. This approach allows for a comparative analysis of this component of interpersonal communication across different educational conditions.

The procedure comprises two stages: an individual problem-solving phase, in which participants complete four empty cells in a table of abstract schematic faces within 7–8 minutes, followed by a collaborative group discussion in teams of four over 20 minutes. A critical feature of the methodology is that the identical “schematic faces”² are assigned different numerical labels in each individual’s worksheet. This design forces participants during the group discussion to reconcile these divergent labelling systems, thereby creating a cognitive conflict that stimulates substantive discussion and necessitates the negotiation of a unified solution.

The indicators of children’s ability to act collaboratively in a conflict situation are as follows:

1. Correctness of the solution, which serves as the key quantitative indicator.
2. Coordination among group members in selecting a strategy and determining the action’s outcome.
3. The nature of the collaborative problem-solving strategy employed.

¹ Full participation of all students in the class was desirable for the study. However, students who were absent during data collection remained eligible for selection by their participating classmates.

² The term “schematic faces” refers to stylised facial diagrams that vary along four distinct features and are arranged in a 3×3 matrix (comprising 9 cells).

Thus, the following variables were calculated for each participant: sociometric status; the number of choices received according to the three sociometric criteria (academic sphere, leisure sphere, and task-oriented sphere); and individual performance on the “Conflict” technique (scored from 0 to 4 points).

For each class, the following group-level metrics were computed: the group cohesion index, the coefficient of reciprocity, the relationship well-being level, group task performance, the degree of coordination in the group solution, and the predominant interaction strategies.

A statistical analysis of the empirical data from the three schools was conducted. The core metric for assessing the development of collaborative ability was the comparison of performance (correctness) between individual and group solutions. The effectiveness of individual and group solutions was quantified using a scoring system when comparing data across the three schools. The number and percentage of correct answers for each of the four matrix cells were calculated. Each correctly completed cell earned an individual student or a group of children 1 point, resulting in a total score ranging from 0 to 4. Subsequently, to enhance the clarity of the statistical data and facilitate the derivation of conclusions, the data were tabulated and used to construct diagrams.

Participants

The study involved 62 fourth-grade students from three different educational systems (56.5% boys; $M_{age} = 10.7$ years, $SD = 0.3$). The distribution of participants across educational systems was as follows:

- Traditional system: $n = 22$ (35.5% of the sample);
- Elkonin–Davydov system: $n = 21$ (33.9%);
- Waldorf pedagogy: $n = 19$ (30.6%).

Results

Means and standard deviations for all variables under study are presented in *Table 1*.

Table 1

Descriptive Statistics for Sociometric Data

		N	M	SD
Number of Choices Received	TS	28	2.96	1.95
	DE	24	3.08	2.04
	WP	22	3.36	2.9
Mutual Choices	TS	22	1.86	0.834
	DE	21	2.24	1.09
	WP	19	1.68	1.2
Choices as an Intellectual Leader	TS	28	2.04	2.65
	DE	24	2.13	2.92
	WP	22	2.5	4.13

A Comparison of Educational Systems by the Level of Relationship Well-Being

To facilitate a clear comparison of the sociometric structure across the three classes studied, a summary table was compiled (see Table 2). This table reflects the distribution of students across the four status categories: “stars”, “preferred”, “accepted”, and “isolated”.

Table 2

Status Distribution of Fourth-Grade Students from Three Schools with Different Educational Systems (TS; DE; WP)

	Number in TS		Number in DE		Number in WP	
	n	%	n	%	n	%
“Stars”	4	50	1	67	5	50
Preferred	10		15		6	
Accepted	13		7		6	
Isolated		50		33		50
(Rejected)	1		1		5	

Note. The two favourable relationship groups are highlighted in bold in the table.

Data analysis reveals the following distinctive patterns. In the school with the traditional system (TS), the largest proportion of children (46%) falls into the “accepted” category, suggesting a neutral yet superficial level of interpersonal connections within this fourth-grade class. Conversely, the largest proportion of students from the Elkonin–Davydov developmental education system (DE) is categorised as “preferred” (63%). This points to a more equitable distribution of peer affection, a less pronounced status hierarchy, and more harmoniously structured relationships within the collective.

Status polarisation — evident in the high proportion of both “stars” and “isolated” students (23% each) in the Waldorf school (WP) — suggests more distinct social differentiation. This class also contains the highest number of isolated children. This outcome may be linked to the core philosophy of Waldorf education, which emphasises individual child development and immerses students in processes of individual creative self-actualisation. This focus can, in some instances, reduce the emphasis on collaborative activities and consequently weaken group integration.

Thus, the most favourable socio-psychological climate is observed in the class from the school implementing the Elkonin-Davydov developmental system, characterised by balanced and non-conflictual interpersonal relationships. While both the traditional and Waldorf schools demonstrate a moderate level of relational well-being, the underlying causes and manifestations differ substantially: the traditional class exhibits neutral-passive social ties, whereas the Waldorf class shows pronounced stratification into popular and isolated students (see Table 2).

A Comparative Analysis of Educational Systems Based on the Group Cohesion Index and Coefficient of Reciprocity

In terms of the group cohesion index at the socio-emotional level, all three student groups from schools with different educational systems can be classified at the first (low) level of cohesion (Cn (TS) = 11%, Cn (DE) = 17%, Cn (WP) = 14%), as values ranging from 0% to 25% correspond to this category (see *Table 3*). Consequently, all three fourth-grade groups can be considered insufficiently cohesive, regardless of the educational system.

When calculating reciprocity rates relative to the actual number of choices made rather than the theoretical maximum, all groups showed improved reciprocity indices. However, only the Elkonin-Davydov system (DE) group reached the moderate reciprocity level (50–75%), indicating most preferences were mutually reciprocated. Both traditional (TS) and Waldorf (WP) groups remained at the upper threshold of the low reciprocity level (0–50%), where most affinities remained unreciprocated. Consequently, satisfactory relational development was observed exclusively in the Elkonin-Davydov fourth-grade class (see *Table 3*).

Table 3

Group Indices of Fourth-Grade Classes from Three Schools with Different Educational Systems (TS; DE; WP)

	TS	DE %	WP
Group Cohesion Index (Cn)*	11	17	14
Coefficient of Mutual Choices (CMC)**	49	64	43

Note.

* *Psychological Reciprocity Index reflects group cohesion, representing the proportion of mutual dyadic connections relative to the theoretically possible maximum. Reference values: low ($0 \leq Cn \leq 0.25$), medium ($0.25 < Cn \leq 0.5$), high ($0.5 < Cn \leq 0.75$), very high ($0.75 < Cn \leq 1$).*

** *Coefficient of Mutual Choices indicates the ratio of mutual choices to the total number of choices made. Higher values reflect stronger connectivity within the group's core, where member interactions shape the development of communal bonds. Reference values: low ($0 \leq CMC \leq 0.5$), medium ($0.5 < CMC \leq 0.75$), high ($0.75 < CMC \leq 1$), very high ($CMC > 1$).*

A Comparison of Educational Systems Based on Models of Intellectual Leadership

Distinct models of intellectual leadership were identified across the three classes. In the Traditional System (TS), leadership was distributed among four students (14% of the class), with three of them forming central micro-groups within the classroom. In the Elkonin-Davydov Developmental system (DE), leadership was clearly concentrated in one student (4% of the class), who formed the core around which the class coalesced. In the Waldorf Pedagogy (WP), four students (18% of the class) emerged as intellectual leaders, all possessing favourable sociometric statuses. In this particu-

lar fourth-grade class, the intellectual leaders did not constitute the class “core” but were neither isolated nor formed a closed group. Across all cases, intellectual leaders maintained high sociometric status, confirming their influence in both academic and communicative domains.

Children’s ability to collaborate in groups while solving visual-logical tasks was assessed through the “Conflict” technique, which involved both individual and group assignments. The study included 62 fourth-grade students (N=62) from three different educational systems: Elkonin-Davydov system (DE) — 21 students, Waldorf school (WP) — 19 students, and traditional school (TS) — 22 students. Additional data were gathered through systematic observation of student interactions in four-person working groups within their classrooms.

Comparison of the Effectiveness of Individual and Group Work

Correctness of Solutions. The data on the success rates of individual and group solutions obtained in the three described classes from schools implementing different educational systems are presented in *Table 4* and *Table 5*. As evident from *Table 5*, in the school with the Waldorf educational system (WP) and the school implementing the Elkonin–Davydov developmental education system (DE) with its specific organisation of collaborative work, the level of collaborative effectiveness significantly exceeds the corresponding results of students from the school with the traditional educational programme (TS). Whereas the average score for successful group task completion in the TS school is 1.2 (with a maximum score of 4), in the DE and WP samples, it is 3.2 and 3.0 points, respectively. The difference between the sample from the traditional school (TS) and the other two samples is statistically significant ($p < .001$).

Table 4

Correctness Indicators of Individual Solutions in the Three Studied Student Samples (Based on the “Conflict” technique)

	Number of students, N	Mean correctness score, M	% of Maximum Score	Standard Deviation, SD
DE	21	1.38	35	1.83
WP	19	1.32	33	1.67
TS	22	0.7	18	1.03

Table 5

Correctness Indicators of Group Solutions in the Three Studied Student Samples (Based on the “Conflict” technique)

	Number of groups, N	Mean correctness score, M	% of Maximum Score	Standard Deviation, SD
DE	5	3.2	80	1.79
WP	5	3	75	1.41
TS	5	1.2	30	1.64

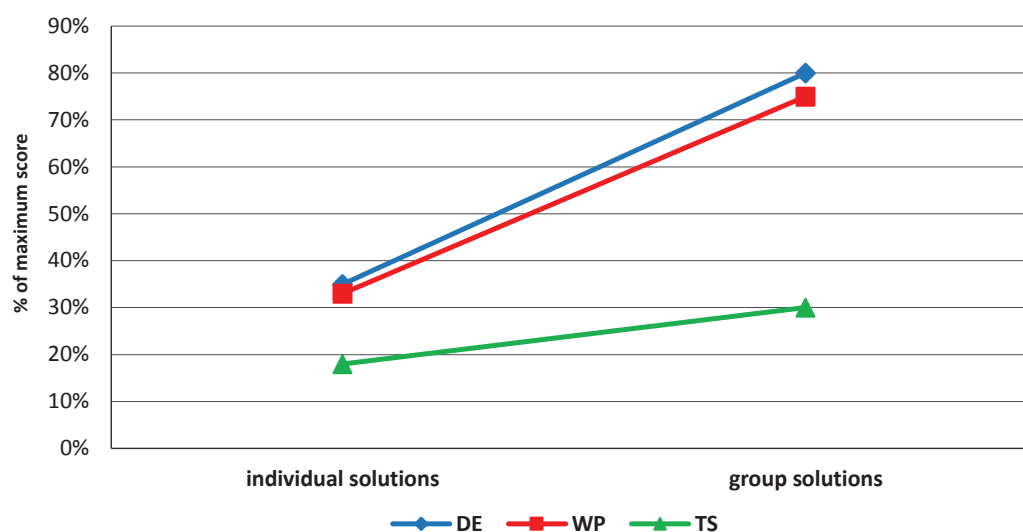


Figure 1. Difference in the effectiveness of individual versus group work — the results of students from the different school types — DE, WP, and TS

Note. The X axis shows individual and group solutions. On the Y axis — percentage of maximum possible score (mjn — 0%, max — 100%)

The dynamics of the increase in group results compared to individual results in the samples from the three school types are presented in Figure 1. On the graph, the effectiveness of individual and group solutions is expressed as the percentage of the average correctness score relative to the maximum score. The graph shows that the correctness of individual solutions in the three samples, namely from the school with the Elkonin–Davydov system (DE), the Waldorf school (WP), and the traditional school (TS) — are close to each other. Despite this, the correctness of individual solutions in the traditional school is nevertheless significantly lower than in the other two samples. The correctness of group solutions in the DE and WP samples is two and a half times higher than in the TS sample. Furthermore, in the school with the Elkonin–Davydov system, which emphasises collaborative learning, the gain in effectiveness of group solutions — despite relatively low individual indicators comparable to those in the traditional school — is several times greater than the corresponding gain in the traditional school. This indicates that the adequate use of group formats in educational work significantly enhances the effectiveness of collaborative problem-solving.

Coordination. The results for this indicator demonstrate that the majority of children across all studied samples were ready and willing to work collaboratively. This was evidenced by the presence of drawings in all empty cells across all groups, with the exception of one. However, as described in the data above, group solutions were not always successful. Observational data indicate that while children’s positive attitude towards collaborative work is a crucial factor, primarily for resolving interpersonal conflicts (i.e., non-substantive conflicts that escalate into personal attacks), it is insufficient for developing a successful group problem-solving strategy.

Strategy. To identify strategies for collaborative problem-solving, we analysed observational data from an experiment involving fourth-grade students in a school

implementing the Elkonin–Davydov developmental system (DE), which places particular emphasis on collaborative work. The analysis revealed that the most successful strategies, in terms of solution correctness, were those that achieved a reflexive analysis of the group members’ positions, involving an exchange, confrontation, or acceptance of differing viewpoints. The triggering factor in most effective group strategies was the children’s detection of the methodologically embedded conflict. This is further supported by the fact that the only group in the class that failed to detect this pre-designed methodological conflict was also unable to solve the task correctly. The detection of the conflict was manifested in the group members’ realisation that the numbering of pictures differed across their otherwise identical individual sets. In their subsequent collaborative work, the groups approached the problem in different ways. In the work “Assessment of Metasubject Competencies of Primary School Graduates” (Ulanovskaya, 2015), the author identified and described three main group strategies for resolving a given socio-cognitive conflict to reach a common group solution. These same strategies were also identified in the present study (see *Figure 2*).

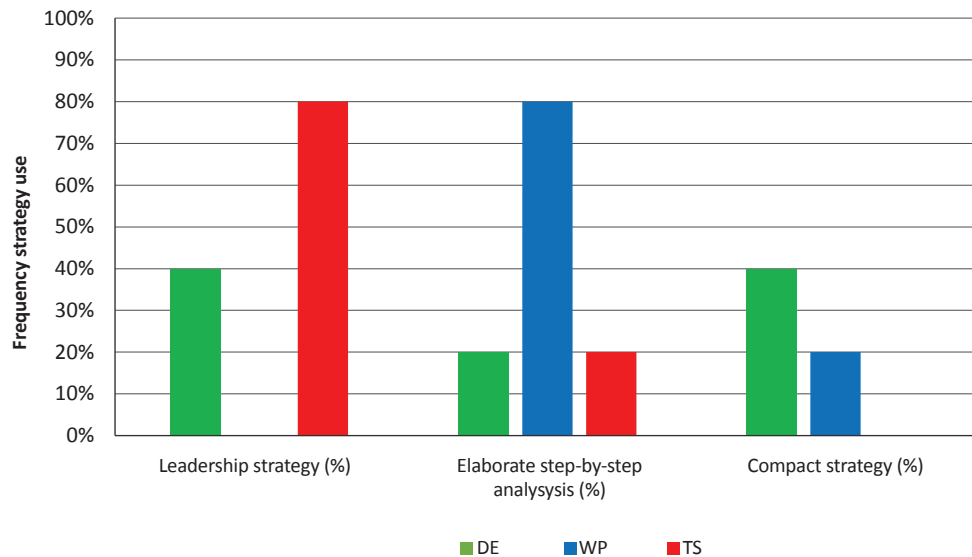


Figure 2. Distribution of Collaborative Problem-Solving Strategies Across Different Educational Systems

Observation results revealed substantial differences in collaborative problem-solving strategies among students from different educational systems (see *Figure 2*). In the traditional educational setting, a **leadership strategy** predominated, as evidenced by characteristic student statements (“Let’s first choose a leader and then solve the problem”) that were not observed in other educational environments.

In the classroom from the school implementing the Elkonin-Davydov system, a diversity of cognitive problem-solving strategies was observed. The greatest effectiveness was noted in groups that employed:

- **an elaborate analytical strategy**, where participants systematically compared their individual solutions by analysing visual elements and the reasoning behind their systematisation;

- **a compacted integrative strategy**, characterised by abandoning reliance on pre-formed individual solutions and constructing a shared solution from scratch;
- **a leadership strategy with an organisational management style**, where the group leader solicited input from participants through clear role distribution and decision-making.

The Waldorf school presented a different pattern: the majority of groups preferred **an elaborate step-by-step (analytical) strategy** for resolving socio-cognitive conflict. This preference may be attributed to the specifics of the pedagogical approach, which emphasises detailed analysis and individual reflection (Rawson, 2019).

Discussion

The aim of this study was to compare the characteristics of interpersonal communication in different educational systems: the Elkonin-Davydov developmental system, the traditional system, and the Waldorf pedagogy. The results revealed that the Elkonin-Davydov system demonstrated the highest Coefficient of Mutual Choices (CMC=64%) compared to the traditional (CMC=49%) and Waldorf (CMC=43%) systems. This finding aligns with the theoretical principles of the Elkonin-Davydov system, where learning cooperation is not a random byproduct but a central tenet of the educational process organisation (Rubtsov et al., 2024; Zuckerman, 1996). For instance, studies on elementary school students (Rubtsov et al., 2021) have shown that the purposeful organisation of learning cooperation enhances classroom cohesion. International research (Alacapinar & Uysal, 2020; Johnson & Johnson, 1975; Johnson & Johnson, 1994) corroborates that cooperative-based learning systems foster more stable positive peer relationships compared to the traditional system, which primarily focuses on individual work.

Students from the Elkonin-Davydov system demonstrated a threefold higher effectiveness of group work ($M = 3.2$) compared to students from the traditional system ($M = 1.2$). This result can be explained by the specific organisation of learning activity within this system, where student development occurs through the very process of forming learning activity (Polivanova, 2017). A meta-analysis (Slavin, 1996) showed that 50 out of 64 studies (78%) found significant positive effects on student achievement when Cooperative³ Learning methods were incorporated into the educational process, with no studies reporting significant negative effects. Domestic research (Rubtsov et al., 2024; Ulanovskaya & Yanishevskaya, 2023; Zuckerman & Venger, 2010) also confirms improvements in academic performance and motivation among students following the implementation of group work in the learning process.

The traditional educational system demonstrated the lowest results both in terms of the level of reciprocity of positive relations and the effectiveness of group work. These findings are consistent with research on the shortcomings of traditional education in developing social competencies (Johnson & Johnson, 2013; Polivanova, 2000; Zuckerman, 1996). As these researchers note, traditional education contributes little

³ Cooperative Learning methods – refer to a broad range of pedagogical approaches and techniques in which students work in small groups to help one another master academic material.

to the development of trust, effective group communication skills, student autonomy, and initiative, which is attributed to its authoritarian teaching style and competitive environment. The problem is further exacerbated by the fact that the emphasis on knowledge transmission at the expense of developing communicative skills in traditional education leads to a deficit in adequate interpersonal communication among students (Johnson & Johnson, 2013; Polivanova, 2000; Prasolova, 2018).

Education based on the Waldorf pedagogy system demonstrated a paradoxical combination of high group work effectiveness ($M=3.0$) with pronounced status polarisation: 23% “stars” and 23% “isolated” students. Research on Waldorf education indicates that its non-evaluative system creates a psychologically comfortable environment for self-realisation but may alter collective forms of interaction (Taplin, 2024). As noted by international researchers, despite the generally favorable atmosphere in Waldorf schools, certain social stratification can be observed, attributed to a deficit in structured interaction alongside the emphasis on individual development of each child (Taplin, 2024; Ruhi, 2024).

Unlike the traditional and Elkonin-Davydov systems, where intellectual leaders with high sociometric status were identified, this phenomenon was not observed in the Waldorf system. This may be attributed to fundamental differences in the organisation of the educational process. Research on the sociometric status of primary school students indicates that in systems utilising grades, the social structure of a class naturally forms around students with high academic performance (Bityanova, 2005). Such “intellectual leaders” become social hubs for several reasons. Firstly, they are perceived as possessors of valuable knowledge who can provide assistance. Secondly, their academic success confers a certain social status; and thirdly, from a practical standpoint, associating with them can be advantageous for academic purposes (e.g., obtaining help, copying work). This leads to the formation of a distinct class “core” composed of academically successful students. It can be hypothesised that in Waldorf schools, the use of a non-evaluative system in the primary grades removes academic performance as a criterion for social preference. The absence of this factor alters the motivational structure for choosing communication partners, as the practical necessity to select partners based on their academic achievements disappears (Bityanova, 2005; Taplin, 2024; Ruhi, 2024;).

Furthermore, it is important to note that the absence of pronounced intellectual leaders in Waldorf schools does not indicate a lack of academically strong students. Rather, it reflects a fundamentally different value system, where academic achievements are not subject to social comparison and do not determine an individual’s position within the group hierarchy.

Conclusion

This study has demonstrated that, despite methodological limitations and sample size constraints, the educational system exerts a determining influence on the nature of students’ interpersonal interactions, their capacity for effective cooperation, and the formation of the socio-psychological climate within the classroom community. The Elkonin-Davydov developmental system creates the most favourable conditions for

fostering interpersonal communication among peers. This, in turn, leads to effective group interaction strategies and significantly enhances task-solving efficiency. This outcome is achieved through the targeted development of collaboration skills within the educational process and an orientation toward subject-subject communication mediated through dialogue.

Limitations

Like any research, this study has several limitations that should be considered when interpreting its findings:

1. The research was based on a comparative analysis of three classes: one from a school with a traditional educational programme, another from a school implementing the Elkonin-Davydov developmental education system, and a third from a Waldorf school. This sample size does not allow for the generalisation of the conclusions to the entire domain of children's interpersonal communication in schools with different educational systems.

2. The absence of some students in all three classes during the sociometric data collection affected the accuracy and reliability of the results. The partial exclusion of these pupils from the overall social context of the classroom distorted the actual picture of interpersonal preferences and relationship dynamics.

3. The study design did not allow for the observation of students' everyday interactions in the natural school environment, specifically during classroom instruction and breaks. Consequently, it was impossible to account for aspects of interpersonal communication that manifest themselves in various daily communicative situations within school life.

Ethics Statement

Approved by the Ethics Commission for Scientific Research at the Federal Scientific Centre for Psychological and Interdisciplinary Research (conclusion dated 31.01.2024 No. 4)

Informed Consent from the Participants' Legal Guardians

Written informed consent to participate in this study was provided by the parents of all students.

Author Contributions

A.S. conceived the idea. K.P. collected the data. A.S. and K.P. supervised the results of this work. All the authors discussed the results and contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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