



ISTVÁN MEDOVARSZKI

**The development of basic skills in the first grade
in informal group-oriented activity space**

Theses for doctoral (PhD) thesis

Thesis supervisors:

Irén Virág, PhD. habil.

Zsolt Mogyorósi, PhD.

Eger, 2024

ISTVÁN MEDOVARSKI

**The development of basic skills in the first grade
in informal group-oriented activity space**

Theses for doctoral (PhD) thesis

1. TABLE OF CONTENT

1. Table of content..... 5
2. Introduction 6
3. The purpose, questions, and hypotheses of research..... 8
4. The research sample and methods..... 10
5. The examination of hypotheses..... 13
6. Analysis of the fulfillment of research objectives..... 16
7. Conclusions 17
8. Summary 19
9. Publications 24

2. INTRODUCTION

One of the primary criticisms against our current educational system is that not every student participating in institutionalized education acquires the fundamental competencies necessary for successful adulthood. The methods based on frontal learning organization prevalent in schools do not help students develop their basic skills. Their learning environment is not stimulating, and it does not support group collaboration or personalized, differentiated education.

In our school experiment, we sought answers to how we can create a modern classroom environment that serves skill development with low cost expenditure and by restructuring and rethinking existing resources. We were interested not only in rearranging the classroom but were determined to explore the scientific background justifying the validity of this learning environment and to develop the methodological basis that would truly make us successful. We wanted to make our results and effectiveness measurable and verifiable, which we discussed in detail in the dissertation.

Drawing on the experience of many years, we clearly see that children studying within institutional frameworks and the educators teaching them have numerous needs that would be essential to fulfill in order to support effective school development work. Meeting these needs is possible with low cost expenditure, does not require specialized knowledge from educators, and minimal adjustments in educational theory make school processes more fruitful. The dissertation presented an informal group-oriented activity space called the learning environment and the related pedagogy and didactics, which provide straightforward and reassuring answers to the pedagogical questions of today's schools. ICsFT (informális csoportorientált foglalkoztató tér in Hungarian) can be interpreted from two aspects: on the one hand, from the dimension of the learning environment, and on the other hand, from the context of the learning-teaching philosophy. Our learning environment was created to support group learning organization, with the clear concept that the separate learning spaces support learning processes based on specific and clearly defined themes. In line with this, six thematic spaces in the classroom were created: (1) the discussion and explanation activity space, (2) the ICT activity space, (3) the arts activity space, (4) the experimental activity space, (5) the relaxation activities space, and (6) the play and exercise activity space. In these spaces, students spend the same amount of time in each lesson or double lesson, and the children work in a carousel-like manner

at the given stations. We see the possibility to create these activity spaces in every regular school classroom, without the need for mobilizing extra resources.

In our dissertation, we presented a multi-cycle pedagogical action research conducted at Tibor Jankay Bilingual Primary School in Békéscsaba. In our work, we started from the following problem statements:

- *The traditional learning environments of institutionalized education do not support informal, implicit, and latent learning. These forms of learning could effectively be integrated into everyday teaching and learning practices, increasing the efficiency of education if the learning environment were supportive and inspiring.*
- *The use of traditional learning organization methods and the usual frontal or simple group arrangements in classrooms limit the communication opportunities for students, and the time they have for communication is shorter than ideal. These negative effects can be compensated for in the informal group-oriented activity space, which will lead to faster and more robust development of basic skills.*
- *During the transition period from kindergarten to school, children are extremely motivated and very interested in school life and learning. The anticipation before the start of the academic year and the strong intrinsic motivation significantly decrease by the end of the academic year, leading to a decline in enthusiasm for learning and the joy of going to school fades away. One of the strongest criticisms against institutionalized education is that it removes the joy of learning activities, exploration, and acquisition from children. In the informal group-oriented activity space, the fundamental skills of children learning there develop dynamically as a result of strong motivational support.*
- *The traditional school teaching and learning processes are often dominated by frontal learning organization and educational solutions based on teacher dominance. The teacher often appears as the sole source of knowledge, the distributor of learning resources. According to the constructivist learning theory based on cognitive psychology, knowledge is built within the learners. Knowledge construction cannot be imagined without the thorough exploration of prior knowledge. Seamless learning or conceptual changes cannot occur without the knowledge construction based on the learners' prior knowledge. The group activities taking place in our specific learning environment serve the building of knowledge, resulting in a significant development of the abilities that determine success.*

3. THE PURPOSE, QUESTIONS, AND HYPOTHESES OF RESEARCH

During our educational action research, we set methodological, educational-theoretical, and research-methodological goals, the realization of which we expected over a period of three two-year cycles. The main objectives of our research were as follows:

- *Creation of the learning environment in the informal group-oriented activity space*
- *Development of the teaching-learning philosophy of ICsFT, methodology elaboration*
- *Comprehensive assessment of the abilities of first-grade students in elementary schools maintained by the Békéscsabai School District Centre (Békéscsabai Tankerületi Központ) using the DIFER-test*
- *Evaluation and assessment of spontaneous development over the course of one academic year*
- *Examination of the elementary abilities of the students involved in the research at input and output levels*
- *Evaluation and assessment of the development of abilities in the students of the student group involved*

In the course of our complex research related to the compound pedagogical experiment, we felt the need to answer numerous questions that span a very broad horizon. We did not have the opportunity to fully answer each question explicitly and measurably; during the research, we consider pedagogical experience and analyses based on exact statistical indicators as complementary to each other. The need to answer the following questions prompted the implementation of the school experiment:

- *Can the traditional group learning organization be made more effective by thematizing the groups and carrying constant activities in every lesson?*
- *Can critical cognitive skills be developed more dynamically and effectively if the ICsFT learning organization implicitly reflects on the criterion-oriented development of these skills?*
- *Which elementary basic skills develop most significantly through learning-teaching in thematic group locations?*
- *What learning organization procedures and methodologies provide the most significant support for surpassing spontaneous development?*
- *How can the institutional learning environment be transformed to effectively support learner-centered activities?*
- *Can we create a learning environment with minimal resource utilization where children's skills develop more dynamically than in a traditional school environment?*

In our research, when analyzing the available assessment results, we aimed to confirm or refute the following hypotheses:

• *H₁: In the case of the participating students, the spontaneous development of fine motor control exceeds the measurable value at the end of the first grade compared to the control group*

• *H₂: By the end of the first grade, a higher proportion of the students included in the research reach the optimum level in phoneme perception compared to those students who were not included in the study.*

• *H₃: By the end of the first grade, the vocabulary of relations of the students involved in the study develops to a greater extent than the results of those students who do not learn according to educational philosophy of learning-teaching in the informal group-oriented activity space.*

• *H₄: Children learning in the informal group-oriented activity space make greater progress in pre-math skills than students who were not included in the program.*

• *H₅: The development of the participating students in the area of deductive reasoning reaches the level of spontaneous development of the control group.*

• *H₆: Our students reach the predicted 4 percentage point spontaneous development in the elementary basic skill of understanding of cause and effect based on the evaluation of the 2002 study.*

4. THE RESEARCH SAMPLE AND METHODS

Before presenting the results of our research, we find it inevitably necessary to conceptualize the following concepts, as these concepts serve the understanding of the dissertation and the acceptance of our research thinking. The clarified concepts illuminate our specific pedagogical perspective and briefly clarify anomalies that could otherwise be criticisms of the research.

- *Baseline population* → During the research, both the input and output skill assessments of all first-grade students in the elementary schools maintained by the Békéscsabai School District Centre were conducted.
- *The experimental class* → In the 2021-2022 academic year, the first-grade students starting in class 1. b at Tibor Jankay Bilingual Primary School in Békéscsaba. We publish the results of each student in the class, and we do not delete any outliers - whether positive or negative - as we do not want to deliberately distort the evaluation results. Throughout the dissertation, the students in the class involved in the research are referred to as 'participating students'. Parents have consented to the anonymous publication of the evaluation results. 28 students participated in the input assessment, and 27 in the output assessment
- *Control group* → In our two-group school experiment, the results of the experimental group is compared with the results of the control group students. After the input assessment, we conducted matching, where we removed students from the study population in a way that the initial averages matched. To ensure the testability of the experimental effect, it was necessary to ensure that the sample sizes were equal. Therefore, we applied the following method for each skill area: The input skill development of each member of the examined group was determined. With the input evaluation results of the participating students and seeking students in the total sample who achieved the same starting results, we randomly selected children using a sampling procedure. After pairing the students, the experimental group and the control group had the same number of participants, and their input results matched exactly. This process was repeated for each skill area.
- *Elementary basic skills* → During the research, the development of the following basic skills were assessed: fine motor control, phoneme perception, the vocabulary of relations, pre-math, deductive reasoning, understanding of cause and effect. In our study, we do not examine the development of social skill as its assessment heavily depends on the subjectivity of the examiner, and elementary categorization and elementary combinatorial skills are not assessed either.
- *Spontaneous development* → In May 2002, József Nagy and his research team conducted the DIFER assessment with 4 students from each first grade in every school in Hungary, representing a sample of over 20,000 students. Furthermore, following a stratified sample of 150 students, they also assessed students in the middle group, the senior kindergarten group, and those finishing the 3rd grade with the help of psychology students conducting psychological studies. In our dissertation, we consider spontaneous development as the changes observed between different stages during the maturation of basic skills (e.g., between senior kindergarten and the end of 1st grade). In our research, we will match the early academic year assessment results of first graders with the results of students in the senior

kindergarten group, assuming that at this point, students produce the same results they would achieve by the end of senior kindergarten, as we consider the school's developmental impact negligible at this stage. The end-of-year evaluation naturally corresponds to how József Nagy and his research team recorded the development of elementary basic skills of first graders. Thus, the difference between the early academic year and end-of-year evaluation and assessment will determine the extent of spontaneous development.

Our pedagogical research involved all first-grade students in every elementary school maintained by the Békéscsabai School District Centre during the 2021-2022 academic year. This means that data was collected from 25 schools; if a single institution had first-grade students studying at multiple locations, they were considered as one entity in the research.

The experimental group was the 1st grade class at Tibor Jankay Bilingual Primary School that 28 students attended during the 2021-2022 academic year. All of them came from well-organized, caring families, typically with a middle-class background. The intellectual and emotional development of the children corresponded to their age characteristics, and all of them came to first grade ready for school. Naturally, there were differences in the pace of development, but we were able to handle this through continuous differentiation, exploration of individual needs, and meeting those needs accordingly.

	Baseline population	Research sample	Basis of comparison
<i>Class (input)</i>	47 classes	1 class	46 classes
<i>N^o (input)</i>	915 students	28 students	887 students
<i>Class (output)</i>	44 classes	1 class	43 classes
<i>N^o (output)</i>	850 students	27 students	823 students

During our two-group pedagogical experiment, we chose the Diagnostic Assessment Systems for Development for the primary and secondary assessment of the students' skills, which contains seven subtests. During their administration, educators can get a complete picture of the students' basic elementary skills. Its significance lies in the fact that development can be targeted and implemented during individual differentiation. The seven basic skills examined by DIFER are as follows: fine motor control, phoneme perception, the vocabulary of relations, pre-math, deductive reasoning, understanding of cause and effect and social skills. After the assessment, the program package provides information about the level of students have achieved in the elementary basic skills. To determine this five levels are defined: preparatory, beginner, intermediate, advanced, and optimum. The seven basic elementary skills defined by

the Diagnostic Assessment Systems for Development can be considered the basic conditions for the development of the following areas:

- *fine motor control* → *teaching writing*
- *phoneme perception* → *teaching reading*
- *the vocabulary of relations* → *verbal communication*
- *pre-math* → *cognitive development*
- *deductive reasoning and understanding of cause and effect* → *cognitive development*
- *social skills* → *being in schools, development*

The evaluation and assessment related to the DIFER test were carried out strictly in accordance with the instructions specified in the guide. The instructions were at the top of each test sheet that the examiners had to adhere to. In order to obtain truly reliable evaluation results, every educator conducting the tests adapted to these instructions. Since it was inherently impossible for only one or two teachers to conduct the DIFER test on the entire sample at the beginning of the academic year, before the assessment period, all relevant colleagues received a written information sheet in which the person leading the research (the author) informed them about the course of the assessment and all the information necessary for the tests to be carried out in a uniform manner according to rules and methodology. In schools, developmental educators as well as class teachers were involved in conducting the evaluation and assessment. Data collection was done in groups of 4 (fine motor control) and in separate locations with individual tests (phoneme perception, the vocabulary of relations, pre-math, deductive reasoning, understanding of cause and effect). We made a firm request for schools to allocate three occasions per student for conducting the assessment. The necessary tools were available everywhere for conducting the assessments - counting sticks, coins, erasers, evaluation charts. Excel spreadsheets were prepared for data recording, allowing for the entry of ones and zeros (except for the first item of pre-math, which allowed for entries up to 0-21). The original test administration instructions require the recording of a question mark for tasks in which the tested students make mistakes, but for the sake of simpler and more automated calculation, the teachers were asked to document zeros for incorrect answers.

5. THE EXAMINATION OF HYPOTHESES

When examining hypotheses, our results supported by statistical tests are taken into account, which show the average spontaneous development assessed in the involved student group (1), the proportion of students who reached the optimum level of development (2), and the level of development achieved starting from individual skill levels compared to members of the control group (3).

- *H₁: In the case of the participating students, the spontaneous development of fine motor control exceeds the value that can be assessed in the control sample by the end of first grade.*

In the case of critical cognitive skill handwriting-motor coordination, by the end of first grade, 48.15% of the involved students reached the optimum level, which does not differ significantly from the total sample's 48.89% and the 2002 evaluation's 48% results. However, the extent of spontaneous development significantly exceeded the control group's 33.49 percentage points and the 2002 large-sample evaluation's 25% results. For the student group involved in the research, this development was 46.76 percentage points, significantly higher compared to the average result of the 2002 assessment and the 23.73 percentage point development in the 2022 output evaluation. The progress made by the members of the total sample starting from the skill levels achieved by the involved students in the initial evaluation was also examined. Upon examining the data, an observation was made about the participating students. The students involved in the research showed greater development over the course of one academic year compared to the members of the control group. Taking all of this into consideration, we consider hypothesis H₁ to be confirmed.

- *H₂: By the end of first grade, a higher proportion of our students involved in the research reach the optimum level in the area of phoneme perception compared to students who were not included in the study.*

During the examination of phoneme perception skills, we found that the 6.17% progress achieved over one academic year exceeded the 5% assessed by Nagy József and colleagues (not significant), but fell short of the 7.93% result of the total study population involved in the 2021-2022 study (also not significant). The non-significant values are likely due to the appearance of a ceiling effect, where with high initial results, the proportion of students reaching the optimum level will not likely to improve further over time. After comparing the development achieved from initial skill levels with the members of the total sample, we do not see a significant difference. By the end of the academic year, 85.19% of the participating students reached the

optimum level, which is slightly higher than the total sample's 84.54% rate, and obviously higher compared to the 78% of the 2002 large-sample study. Therefore, we consider hypothesis H_2 to be confirmed.

- *H₃: By the end of the first grade, the vocabulary of relations of students engaged in the informal group-oriented activity space improves to a greater extent than that of students who do not learn according to this philosophy.*

In terms of the development of relational vocabulary, we can see that the average results of the group of participating students and the total sample are almost identical at 8.33% and 8.50% ($p=0.931$), indicating that no significant difference can be identified at first glance. However, if we only observe the results of those students from the entire study population who achieved the same input results as the participating students, a more nuanced picture emerges. As previously demonstrated, out of the identified nine ability levels, in seven cases the average development of the participating students was higher than that of the students making up the total sample. When comparing the progress of the control group by 6.02 percentage points with the development of the experimental group, we do not see a significant difference either at first glance. Although the experimental group undoubtedly showed greater progress, no significant difference can be determined between the results of the two groups ($t=1.217$; $p=0.234$). Taking into account the averages of spontaneous development and development from initial ability levels, as well as acknowledging the more pronounced but not significantly higher development of the experimental group, our hypothesis H_3 is partially confirmed.

- *H₄: Children learning in the informal group-oriented activity space make greater progress in the area of pre-math skills than students who were not included in the program.*

When examining pre-math skills, it was observed that significantly higher proportion of the participating students (88.89%) reached the optimal level of development compared to students who did not learn in the informal group-oriented activity space. The assessment of spontaneous development also showed the same trend, with the progress achieved by the participating students over one academic year (22.86%) obviously surpassing the development of the total sample, with this greater progress being significant at $p=0.003$. In the case of basic arithmetic skills, 17 ability levels were identified based on the initial assessment of the participating students, and in 16 cases, the progress of the participating students over one year was higher than that of the control group members. The spontaneous development of pre-math skills in the experimental group was significantly higher than that of the control group ($t=2.744$; $p=0.011$), and the Cohen's $d = 1.110$ value also showed an extremely high experimental effect following

the outcome assessments. Following a complex statistical analysis of the results, hypothesis H₄ was confirmed.

- *H₅: The development of the participating students in the area of deductive reasoning reaches the level of spontaneous development of the control sample.*

The progress made by the group of students involved in the research in the area of critical cognitive skill of deductive reasoning during one academic year was 17.13%, which is clearly higher than the 12.84% result for the entire study population. When comparing the development adjusted to the initial ability levels, in eight out of the ten layers examined, the participating students achieved greater progress. Comparing the average development of experiential reasoning to the fitted control group, we can see that the control group only achieved a 7.64% development. Comparing the developmental results of the experimental group with the 7.64% development of the control group, it is observed that the students involved in the program achieved significantly greater progress by the end of the academic year ($t=2.940$; $p=0.007$). The determined Cohen's d after the output assessment of the experimental group and the control group was 1.075, and the effect size calculated from the development averages of 0.62 also demonstrated significant experimental effects in the critical skill of deductive reasoning. Based on the presented results, the H₅ hypothesis can be considered confirmed.

- *H₆: Our students achieve a spontaneous development of 4 percentage points in the elementary basic skill of understanding of cause and effect based on the evaluations of the 2002 study.*

One of the most surprising results that strongly supports our pedagogical idea was obtained when examining the skill of understanding of cause and effect. The progress made by the children learning in the informal group-oriented activity space during one academic year (20.37 percentage points) was nearly double that of the entire sample (10.32 percentage points), and five times that of the average progress obtained from the 2002 study (4%). Furthermore, it significantly surpassed the progress of the control group (14.58 percentage points) as well ($t=2.909$; $p=0.007$). The extent of spontaneous development not only reached the results of the large-scale study being compared, but also significantly exceeded it, thus confirming hypothesis H₆ as well.

6. ANALYSIS OF THE FULFILLMENT OF RESEARCH OBJECTIVES

The action research presented in the dissertation is the result of many years of pedagogical work, and based on our evaluation, it showcases extraordinary scientific and practical results. The structure of the cycles and the achievement of the set goals required serious pedagogical planning and professional precision. At Tibor Jankay Bilingual Primary School in Békéscsaba, A learning environment was created where students could work in groups during lessons. The groups were thematic, serving complex personality and skill development. In addition to transforming the learning environment, we developed our philosophy of learning and teaching, and established the methodology of the informal group-oriented activity space. We also aimed to make the effectiveness and success of our innovative methodology measurable. Therefore, it was natural for us to use the results of the beginning and end of year DIFER assessments carried out for years in the primary schools maintained by the Békéscsabai School District Centre. Since a complete access to the results of these assessments for all students and classes in the school district was provided, a comprehensive picture could be obtained. These evaluation results had been shared with the relevant institutions, allowing the schools to benefit from our research. By conducting primary and secondary assessments, we were able to evaluate the extent of spontaneous development, enabling a review of pedagogical practices for all partners. Determining spontaneous development also provided us with an accurate picture of our own effectiveness, thus allowing for the identification of positive practices. The initial and final ability assessment and evaluation of the student groups involved in the research contributed to having a holistic view of our students and being able to establish a complex ability profile for each child, which was an essential source of information for their criterion-oriented development.

Following the conclusion of the research and the formulation of reflections evaluating it, we believe that our research objectives have been fully achieved. We consider our action research to be successful and truly innovative in terms of pedagogy. Our results have continuously been published, our experiences and our new pedagogical model had been shared with the scientific community. We have found satisfactory and credible answers to our research questions, formulated them with scientific rigor, and conducted our investigations with appropriate expertise. As a result, when describing the conclusions of the research, we documented our experiences in a doctoral dissertation.

7. CONCLUSIONS

In our research, we primarily sought to answer how the innovative learning environment we created, along with the related subject pedagogies and learning-teaching philosophy, contributes to a more effective, faster, and enhanced development and improvement of students' fundamental skills. The beneficial effects of organizing group work have been discussed in numerous studies in the past. The positive outcomes of conscious application of cooperation and collaboration within institutional frameworks are not hidden from experts in educational science.

The novelty of the learning environment we have created lies in the thematic organization of groups, emphasizing even more efficient development of basic skills, which can take place in every lesson regardless of subject matter. In order to scientifically ground the organization of learning, we have positioned the learning-teaching philosophy of informal group-oriented activity space within the system of educational theory, and we have developed the comprehensive model of effective group learning with five pillars.

During the research, we elaborated in detail on the conclusions formulated in the dissertation. Here, only a brief summary of them is presented:

- (1) Children starting the first grade of elementary school form an extremely heterogeneous population; therefore, age is considered the least determining factor in class placement.*
- (2) The large-scale study conducted by József Nagy and his research team in 2002 is reproducible, as the DIFER test system continues to perform well two decades later.*
- (3) There is no significant difference detected in the input development of basic skills between students starting school today and those starting school twenty years ago.*
- (4) The DIFER skills clearly form an interconnected system, however, based on the results of the current research, the strength of the relationships is only moderate.*
- (5) In the case of today's students, the level of progress achieved during one academic year exceeds the level determined by the 2002 study for each fundamental skill, which supports the real developmental impact of the elementary school preparatory stage.*
- (6) The progress of children learning in informal group-oriented activity space exceeds the average levels of development determined in the 2002 assessment and the current study.*
- (7) We observed outstanding progress in the group of students involved in the case of the subtests of fine motor control, pre-math skills, and understanding of cause and effect.*
- (8) At the end of the academic year, the proportion of students reaching the optimal level is significantly higher among the students involved in the program in the case of pre-math skills, deductive reasoning and understanding of cause and effect.*

(9) In the area of phoneme perception, we do not see any significant difference compared to the 2002 sample or the results of the control group in the current study. We want to emphasize this because in the informal group-oriented activity space, we consciously seek to increase the number of student-to-student interaction events. Even with a reduction in the frequency and duration of continuous teacher communication (as a model), the rate of development of phoneme perception skills in the group of students involved did not decrease.

(10) With results confirmed by statistical tests, it has been demonstrated that the organization of learning in the informal group-oriented activity space performs well within institutional frameworks. The students involved in the research showed more significant development than their peers who did not learn within these frameworks. This was mostly confirmed by the statistical tests and effect size results.

8. SUMMARY

The foundation of the dissertation was an action research conducted at Jankay Tibor Bilingual Primary School in Békéscsaba. The author was also a participant in the research, able to observe the processes in action. Our action research was organized into three cycles, and the reflections formulated at the end of each cycle were incorporated into the activities of the subsequent cycle. Our research spanned three two-year cycles, each with its own pedagogical objectives and relevant tasks for the research that were carefully planned before each cycle.

The first two-year cycle took place between 2016 and 2018, during which the foundation of our teaching and learning philosophy in educational and pedagogical theory was established, and the unique learning environment called the informal group-oriented activity space was developed. During this period, exploring the literature background also played a dominant role in our activities, as we researched good practices and pedagogical innovations that were well-documented and reliably measurable. We uncovered the history of domestic action research and sought methodological solutions and pedagogical innovations that could serve as intellectual foundations in our work. At this point, we seriously engaged with the historical aspects of reform pedagogies, cooperative learning, and group learning organization in education. In addition to the historical overview, in this stage, we paid special attention to the didactic and learning theoretical basis of various methods. Therefore, we can consider the first two-year cycle as a theoretical phase, which can be interpreted as a theoretical foundation and the subject-pedagogical definition of our teaching and learning philosophy.

We consider our theoretical work defining the comprehensive model of effective group learning with five pillars as one of the outstanding results of the theoretical phase. This model encapsulates the essential framework for dynamically operating and effective group work, describing its optimal functioning. We believe that effective group learning is only conceivable with the complete and stable presence of these five pillars, which are goals, conditions, safety, relationships, and rules. We have published several publications about the model, so we consider the dissemination of our theoretical work successful.

The second cycle, which took place between 2018 and 2020, focused on reinforcing and advancing research methodology. During these two academic years, we searched for pedagogical and psychological assessment solutions that would allow us to evaluate our results in the third cycle and that have appropriate reliability coefficients. Unfortunately, this cycle was heavily impacted by the Covid-19 global pandemic, but we endeavored to take every possible

step to ensure the success of the cycle despite the challenges. During this phase, we tried out numerous tests and test systems that enabled us to create complex learner profiles. In addition to test administration and evaluation, our goal was to find assessment tools that would allow us to gather information on the learner population involved in the research on a large sample. It was important that the tests did not require specialized expertise for administration, so that teachers and educational developers in school practices could administer them. Furthermore, we aimed for the results to be accessible and processable at the item level. Taking all of this into consideration, we ultimately chose the Diagnostic Assessment Systems for Development, which is well-documented and has appropriate reliability coefficients. In addition, DIFER defines the developmental levels to be achieved by the end of each academic year, as well as the extent of spontaneous development to be achieved during one academic year, providing valuable guidance for analyzing the performance of our own students.

The third two-year cycle encompassed the academic years of 2020-2022, with the first year being characterized by our predominant focus on publication activities. It was during this time that we mainly disseminated the partial results that we had documented in earlier phases of the research. The academic year of 2021-2022 served as an opportunity to assess the observed development of critical cognitive skills in the participating student groups over the course of one academic year. Additionally, we aimed to do the same among first-grade students in schools under the jurisdiction of the Békéscsabai School District Centre, who served as the research control group. The initial assessments took place in September 2021, while the second assessments were scheduled for late May to early June 2022. Both the participating students and members of the control group were assigned student codes generated through the KIR evaluation identification tool, allowing for their anonymity to be maintained. This enabled us to compare the results of the first and second assessments and determine the extent of development while ensuring data privacy. Following the assessments, a lengthy data processing period ensued to ensure that analyses in line with the fundamental research methodological requirements could be conducted.

In the next section of our summary, we will briefly mention the unique learning environment we have created, named the informal group-oriented activity space. This space can be interpreted as a philosophy of learning and teaching, where any learning environment in which children work in groups and operate based on a constant thematic framework is considered an ICsFT (informal group-oriented activity space). The creation of thematic groups depends on local conditions, opportunities, and the expertise of educators. Within these spaces, we

emphasize not only the narrow subject-specific development of students but also the enrichment of skills related to the thematic areas covered by the group spaces in a comprehensive manner.

At the beginning of the 2021-2022 academic year, we conducted the DIFER assessment among the entire student population. The DIFER provides a comprehensive assessment of critical cognitive skills such as fine motor control, phoneme perception, the vocabulary of relations, pre-math, deductive reasoning, understanding of cause and effect, social skills, as well as evaluate elementary categorization and elementary combinatorial. In our research, we did not focus on exploring social skills, elementary categorization and elementary combinatorial skills, reasons for which were presented in the dissertation. The test system categorizes students into five levels: preparatory, beginner, intermediate, advanced, and optimum levels. During the initial assessments, we were interested in understanding the students' skill development at the beginning of their studies and compared their average results with the findings of a large-scale study conducted by József Nagy and his research team in 2002, involving 20,000 participants. Following our comparative analysis, we concluded that the DIFER test system continues to function effectively, and the results it provides remain valuable sources of information for educational practice. Furthermore, an observation was made about students in terms of their fundamental skills. It can be stated that today's first-grade students do not significantly differ from children who started school twenty years ago.

At the conclusion of our research, at the end of the 2021-2022 academic year, we organized a follow-up assessment where we assessed the DIFER skills examined at the beginning of the year once again, focusing on the progress achieved over the course of one year. Determining spontaneous development was particularly important to us because through comparative analysis of this development, we were able to evaluate the effectiveness of our own pedagogical experiment. In addition to determining the average values of spontaneous development, we monitored the proportion of students reaching the optimum level and were curious to see how students starting from the same skill level as the participating student group at the beginning of the year performed in the control group. Throughout our research, we formulated six preliminary assumptions, based on which we made the following conclusions:

- (1) The development of the fine motor control basic skill of the enrolled students during one academic year significantly exceeded the development of the control group.*
- (2) During the development of phoneme perception skills, a greater proportion of the enrolled students reached the optimum level compared to the members of the control group.*

(3) By the end of the first academic year, the vocabulary of relations of children learning in the informal group-oriented activity space developed to a greater extent compared to the development of the reference population.

(4) The development of the pre-math skills of the enrolled student group followed a significantly greater developmental path compared to the development of the students in the control group.

(5) In the area of deductive reasoning, the results of the enrolled class not only reached but clearly exceeded the development of the control group.

(6) The spontaneous development of our students in the area of understanding of cause and effect not only reached the developmental value assessed in the large-scale examination of 2002 but achieved a level five times higher than that.

We compared the initial development of the experimental group with the results of the large-scale examination in 2002 and the average of the primary schools of the Békéscsabai School District Centre. Here, we found that in the area of fine motor control, students started elementary school with significantly lower initial skill development compared to both the 2002 average and the total study population average, and these differences were also significant. The marked initial underdevelopment in fine motor control caused the applied methodology to have a very strong developmental effect, and the extent of development was very noticeable in this area. The initial development of phoneme perception and the vocabulary of relations in the experimental group matched the averages of 2002 and the total study population, and no significant differences were found in these aspects. The initial development of pre-math skills lagged minimally behind both reference values, and the difference compared to the 2002 examination was significant. In the case of deductive reasoning, we saw confusing initial results: while we evaluated notably and significantly higher results compared to the 2002 examination, this higher value significantly minimized compared with the total sample. When examining the skill of understanding of cause and effect, we observed significant differences compared to the 2002 assessment, but no significant differences compared to the total sample; the results of the experimental group in both comparisons fell short of the basis of comparison.

After the output assessment, we did not focus on comparing the end-of-year skill development with the two reference values mentioned above. Instead, it was more meaningful for us to examine the extent of development achieved during one academic year. We observed that in the case of every critical cognitive skill, members of the experimental group achieved greater development than members of the control group. This higher level of development was significant in every area except for the vocabulary of relations skill. In addition to examining the differences, effect size was also determined. We found that the methodology, learning

organization, and learning environment used in the experiment had a measurable and significant impact on the development of critical elementary cognitive skills that determine learning success. The experimental effect was moderate in the areas of phoneme perception and the vocabulary of relations. The extent of spontaneous development was compared with the values determined in 2002, and we found that it was significantly higher in the areas of fine motor control, pre-math skills, and understanding of cause and effect. We also observed higher development in the other three areas, but these were not significantly different, due to the ceiling effect resulting from high initial values, so it was difficult to achieve significant results.

The differences between the input and output assessments were significant for all skills in the experimental group, which also supported the success of the experiment. In the dissertation, we examined the effect of the informal group-oriented activity space as an independent variable, so ensuring personal reliability was also an essential task for us. Comparing the developmental values of the three teachers' (who used the method) previous classes, we evaluated significantly higher development in five skill areas in the experimental class; only the phoneme perception development, was not significant due to the ceiling effect, but it was also strong. The results of the statistical tests confirmed that the independent variable had an impact on the improvement of students' achievements.

The statistical analysis of the assessments convinced us that the methodology used in the informal group-oriented activity space is effective and successful, as the development of the participating students exceeds the level that could be predicted in the absence of the applied teaching-learning techniques. We consider our research successful, as our hypotheses – with one exception – have been sufficiently confirmed, thus it can be stated that the informal group-oriented activity space carries a pedagogical innovation.

9. PUBLICATIONS

1. *Tantárgy-pedagógiai kaleidoszkóp: 2022 - Pedagógiai és szakmódszertani tanulmányok az iskola világából.* (szerk.). Líceum Kiadó, Eger.
2. *A szociális készségek szerepe a kooperatív szemléletű, kollaborációra építő csoportmunkában* (2023). In: Medovarszki, István (szerk.). *Tantárgy-pedagógiai kaleidoszkóp: 2022 - Pedagógiai és szakmódszertani tanulmányok az iskola világából.* Líceum Kiadó, Eger. 85-100.
3. *A kritikus kognitív készségek fejlettsége első osztályos tanulók esetében* (2023). Konferencia-előadás. XXIII. Országos Neveléstudományi Konferencia - Elkötelezettség és rugalmasság: a neveléstudomány útjai az átalakuló világban. MTA Pedagógiai Tudományos Bizottság, ELTE Pedagógiai és Pszichológiai Kar. ELTE PPK, Budapest, 2023. október 26-28.
4. *Egy modern didaktika megalapozása felé – A hatékony csoportos tanulás ötpilléres komplex modellje* (2022). Új Pedagógiai Szemle **72.** 9-10 pp. 116-128.
5. *A hatékony csoportos tanulás ötpilléres modellje* (2022). Konferencia-előadás. Kiválóságok az Eszterházy Károly Katolikus Egyetemen - ÚNKP ösztöndíjasaink eredményei Eszterházy Károly Katolikus Egyetem, Eger. 2022. május 31.
6. *A kooperatív tanulás ötpilléres modellje* (2022). Konferencia-előadás. HuCER2022 - Oktatás egy változó világban – Kutatás, innováció, fejlesztés. Magyar Nevelés- és Oktatáskutatók Egyesülete (HERA), Budapest. 2022. május 26-27.
7. *Egy kutatói ösztöndíj körvonalai: Kognitív fejlődés és a tanulás konstruktív formái az informális csoportorientált foglalkoztató térben* (2022). Konferencia-előadás. Az óvodaiskola átmenet aktuális kérdései - VI. Szakmai fórum és könyvbemutató. Eszterházy Károly Egyetem, Eger. 2022. április 25.
8. *A finn oktatási rendszer sajátosságai a tanári professzió szemszögéből* (2021). In: Medovarszki, István (szerk.) *Tantárgy-pedagógiai kaleidoszkóp: 2021 - Pedagógiai, neveléstudományi és szakmódszertani tanulmányok.* Békéscsaba, Magánkiadás. 215-223.
9. *Tantárgy-pedagógiai kaleidoszkóp: 2021 - Pedagógiai, neveléstudományi és szakmódszertani tanulmányok.* (szerk.). Békéscsaba, Magánkiadás. ISBN: 9786150141213
10. *A jelen és a jövő információs társadalmának kompetenciaelvárásai* (2020). In: Medovarszki, István (szerk.) *Tantárgy-pedagógiai kaleidoszkóp: 2020 - Tanulmányok a csoportos tanulásszervezés sajátos gyakorlatairól.* Békéscsaba, Magánkiadás. 109-114.
11. *Modern iskola a 21. században – Egy inspiráló Freinet-koncepció* (2020). Konferencia-előadás. *Kreativitás – Elmélet és gyakorlat* (2020) konferencia. Kocka-Kör Egyesület, Debrecen (Online). 2020. december 11.
12. *A csoportmunkát támogató tanulási környezet reformpedagógiai szemszögéből* (2020). In: Medovarszki, István (szerk.) *Tantárgy-pedagógiai kaleidoszkóp: 2020 - Tanulmányok a csoportos tanulásszervezés sajátos gyakorlatairól.* Békéscsaba, Magánkiadás. 9-16.
13. *Lebutítás vagy disszemináció?: A kulturális javak átadását gátló tényezők a konstruktivizmus és az újmédia szemszögéből* (2020). Új Pedagógiai Szemle. **70.** 7-8 pp. 76-90.

14. *Tantárgy-pedagógiai kaleidoszkóp: 2020 - Tanulmányok a csoportos tanulásszervezés sajátos gyakorlatairól.* (szerk.). Békéscsaba, Magánkiadás.
15. *A pedagógiai flexibilitás lehetőségei és a neveléstudományi beágyazottság elemzése az informális csoportorientált foglalkoztató tér tanulásszervezésében (2020).* In: Acta Universitatis De Carolo Eszterházy Nominatae: Sectio Paedagogica. 77-93.
16. *Freinet nyomán az informális csoportorientált foglalkoztató térben (2020).* In: Karlovitz, János Tibor; Torgyik, Judit (szerk.) Reflexiók néhány magyarországi pedagógia-releváns kontextusra. Komárno, Szlovákia. International Research Institute. 81-90.
17. *Freinet nyomán az informális csoportorientált foglalkoztató térben (2020).* Konferencia-előadás. VIII. Neveléstudományi és Szakmódszertani Konferencia. Komárno, Szlovákia. International Research Institute s.r.o.
18. *A tanulók képzését és személyiségformálását meghatározó tényezők a budapesti Református Főgimnáziumban a Pál utcai fiúk korában (2019).* In: Acta Universitatis De Carolo Eszterházy Nominatae: Sectio Paedagogica. 25-44.
19. *Celestin Freinet Modern Iskola koncepciója (2019).* Konferencia-előadás. Magyar Tudomány Ünnepe 2019 - Értékek a neveléstudományban. Eszterházy Károly Egyetem, Eger. 2019. november 27.
20. *A tanulási sikeresség előfeltételeinek diagnosztikus elemzési lehetőségei az iskola előkészítő szakaszában (2019).* OXIPO: Interdiszciplináris E-Folyóirat 1. 55-68.
21. *Autonóm és önszabályzott tanulási utak az informális csoportorientált foglalkoztató térben (2019).* Konferencia-előadás. In: Ács-Bíró, Adrienn; Maisch, Patrícia; Szabó, Hajnalka Piroska (szerk.) Horizontok és Dialógusok V. konferencia napok: Absztraktkötet Pécs, 2019. május 8-10. Pécs, Magyarország: Pécsi Tudományegyetem, Bölcsészettudományi Kar, Neveléstudományi Intézet.
22. *Alapkészségek fejlesztése inspiráló tanulási környezetben (2019).* Konferencia-előadás. Az óvoda-iskola átmenet aktuális kérdései – IV. szakmai fórum Eszterházy Károly Egyetem, Eger. 2019. április 17.
23. *Matematikai tehetséggondozás az informális csoportorientált foglalkoztató térben (2019).* Konferencia-előadás. Inspiráló tanulási környezetek intézményes keretek között. Oktatási Hivatal, Békéscsaba. 2019. március 25.
24. *A tanulói autonómiát és az önszabályozó tanulást támogató tanulási környezetek szerepe a formális oktatásban (2019).* Konferencia-előadás. In: Karlovicz, János Tartalmi összefoglalók. Štúrovo, Szlovákia. International Research Institute s.r.o.
25. *Tehetségazonosítás az informális csoportorientált foglalkoztató térben (2018).* Konferencia-előadás. Tehetségbarát iskola konferencia. Új Nemzedék Központ, Budapest. 2018. december 10.
26. *A tanulói autonómia és az önszabályozó tanulás támogatása inspiráló tanulási környezetben (2018).* Konferencia-előadás. Motiváció és adaptivitás szakmai nap. Oktatási Hivatal, Békéscsaba. 2018. december 7.
27. *Az IPOO-modell értelmezése a tanulási részképességek diagnosztikus mérései során (2018).* Konferencia-előadás. „OxIPOO” Neveléstudományi Konferencia. Kocka Kör Egyesület, Debrecen. 2018. december 01.

28. *Modell és Valóság – Nemzetközi és hazai IKT kompetenciamodellek érvényesülése a köznevelésben (2017)*. Konferencia-előadás. Játék és IKT támogatott tehetséggondozás szakmai nap. Oktatási Hivatal, Békéscsaba. 2017. december 1.
29. *Tevékenységek központú pedagógiák alkalmazása a gyakorlatban (2010)*. Konferencia-előadás. Segítségadás Közoktatási intézményeknek jó gyakorlatok bemutatásával szakmai program. Oktatási Hivatal. 2010. október 28.