DIAGNOSTIC ASSESSMENT OF SCHOOL READINESS

Editors:
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HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES

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PREFACE

The preface to this work involves drawing insights from numerous existing research findings. These findings collectively suggest that the initial eight years of an individual's life hold paramount importance for personal development. Moreover, acknowledging the substantial variations in children's development emphasizes the necessity for pedagogical strategies to accommodate such differences. Effective educational practices hinge on the ability to differentiate instruction, a process contingent on professional pedagogical diagnostics. These diagnostics aid educators in comprehending individual children, evaluating their current developmental status, and subsequently setting personalized goals for optimal growth. The diagnostic process, led by knowledgeable teachers, is crucial for planning activities that foster effective personalty development or school readiness. However, fulfilling this need demands suitable tests capable of accurately assessing children's development or school readiness.

In Slovakia, educators lacked access to standardized measurement tools for diagnosing crucial skills related to school readiness. Consequently, a three-year research initiative was launched in 2021 by J. Selye University, winning a KEGA (Cultural and Education Grant Agency, Slovakia) research grant. This initiative focused on adapting and standardizing the Hungarian measurement tool, DIFER (Diagnositic Systems for Assessing Development) for practical use by teachers. The collective effort involved researchers from two Hungarian institutions: the University of Szeged and the Hungarian University of Agriculture and Life Sciences.

The extensive research covered 3,050 Hungarian children aged 4–8 years, with 1,609 residing in Slovakia and 1,441 in Hungary. This book seeks to provide an overview of the three-year research implementation and its outcomes. The initial chapter outlines the adaptation process of the DIFER test, elucidating key starting points and critical aspects. Subsequent chapters explore a comparative analysis of regulatory documents in Slovakia and Hungary, exploring both preschool and school educational programs. The fourth chapter focuses on the validity, reliability, and invariance of the DIFER test, confirming its suitability for diagnostic examinations of Hungarian children.

This comprehensive work is intended to benefit researchers interested in school readiness, cognitive and social skills development, and curriculum analysis. Additionally, it holds value for educational decision-makers and is essential reading for practicing teachers and trainee teachers.

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ADAPTATION AND STANDARDIZATION OF THE DIFER TESTS IN SLOVAKIA

Diana Borbélyová, Krisztián Józsa and Alexandra Nagyová

ABSTRACT

The importance of diagnosing a child's individual development is becoming increasingly important in the local areas. In the framework of pedagogical diagnostics, it is particularly important to know the basic skills that are necessary for a successful entry into the first year of primary school - i.e., to successfully master the role of a pupil. Pedagogical diagnostics of preschool children is only in its infancy in Slovakia. Standardized diagnostic tools for determining the school readiness and abilities of a child are also absent. The presented study portrays the fundamental aspects and progress of the KEGA project - *Adaptation and standardization of DIFER (Diagnostic systems for assessing development) for 4-8-year-old children*, the main purpose of which is to contribute to the improvement of the quality of pedagogical diagnostics in kindergartens and primary schools with Hungarian as the language of instruction in Slovakia, namely by adapting a foreign research tool.

Keywords: pedagogical diagnostics, developmental level of a child, testing school readiness, DIFER

INTRODUCTION

The results of numerous international studies show that the first eight years of a person's life are an incredibly sensitive period in terms of personality development (Fink et al., 2019) and investing in early childhood education has a long-term socio-economic return (Józsa et al., 2022). In this sensitive period, various determinants, as well as developing programs, can have an impact on the favourable development of a child's personality. It is a fact that there are differences in the contemporary developmental level of children that must be accepted, and taking into account the diversity of a given class, adequate differentiation must be applied in the educational process. The starting and conditioning factor of differentiation is the implementation of adequate and effective pedagogical diagnostics, with the help of which the teacher determines the current level of development of the individual in defined areas of development. Based on the evaluation of the acquired facts, the teacher is then able to plan and implement activities, set an educational goal, or if necessary, apply developing programs in order to ensure further development.

Diagnosing the Developmental Level of Children

The requirement to know developmental differences in children's abilities and skills before they enter school is given special emphasis, as this milestone in a child's life has an impact on their future success in school. School readiness testing represents the criteria that a child must meet before entering school as a prerequisite for successfully managing the demands of school and the educational process (Burchinal et al., 2015; Duncan et al.; 2020; Keating, 2007; Snow, 2006).

The period of starting school is a very sensitive period both in the development of cognitive abilities and social skills. Numerous experts deal with the study of this period of a child's life, such as Nagy (1980), Snow (2006), Driscoll & Nagel (2008), Józsa et al. (2018) and Józsa and Barrett (2018), who focus their research on identifying skills that play a significant role in a child's cognitive and affective development in early childhood in the first place. Moreover, their research also demonstrates whether there is a provable predictive power of the level of skill development in early childhood on later school success. In their findings, they state that children who, when entering

school, lag behind their peers in either cognitive or affective areas, are at a great disadvantage, which is reflected in their performance and motivation to learn. Therefore, it is necessary for children to have an adequate level of fundamental competences when entering school, and to achieve the desired level of school maturity and readiness.

In the international context, attention is paid to the development of abilities of children under the age of five, yet there are only a few countries in which standardized tools are available for measuring and evaluating the cognitive abilities of children at this age. On the other hand, it is possible to monitor the skills of children from 4 to 8 years old using standardized diagnostic tests in Hungary (Józsa, 2022; Nagy et al., 2004a; Nagy et al., 2004b).

The importance of diagnosing a child's individual development is gaining increasing importance in our country as well, whilst it is emphasized mainly at the theoretical level only. In the framework of pedagogical diagnostics, it is particularly important to know the basic skills that are necessary for successful school adaptation. Based on the ideas of Snow and Van Hemel (2008), we emphasize that valid and reliable diagnostic tools are needed to determine whether a child has reached the necessary level of development to start school. The availability of appropriate and easy-to-use diagnostic tools plays an important role in a child's successful entry into school. Unfortunately, this area in Slovakia is very problematic as there are no standardized diagnostic tools for determining school aptitude - teachers do not have them at their disposal.

At present, measurements are almost exclusively carried out by psychologists (occasionally by special educators) and mostly with the help of psycho-diagnostic tests. Such diagnosis of children's current developmental level is not mandatory, which means that not all school-age children will participate in it. In other words, provided that the parent does not request such testing, the child cannot take it. For this reason, the parent often has no knowledge of the level of abilities and skills of their child, unless they are informed by the teacher themselves based on personal opinions. However, the teacher's opinions without objective measurements supported only by observation can be very subjective. Therefore, we came to the conclusion that it is necessary to standardize a comprehensive diagnostic tool for the conditions of Slovakian education, which would measure the level of defined competence areas of 4-8-year-old children and thus provide a starting point for their

individual development. Such a standardized diagnostic tool would also be useful for diagnosing children's school readiness.

As a result of the facts mentioned above, our research team working at the Department of Primary and Pre-school Education of the J. Selye University in Komárno showed interest in this issue and decided to construct a research tool for diagnosing children's school readiness. The construction of a research tool is a precise and systematic activity, where the prearranged steps lead the constructor to their goal - the creation of a reliable and valid research tool. As Gavora (2012) states, a researcher has two options – either create an original research tool, or adopt an existing one. We decided to adapt and standardize the already existing DIFER research tool that is used abroad. The implementation of our intended activity took place from 2021 as part of the KEGA project - *Adaptation and standardization of DIFER (Diagnostic systems for assessing development) for 4-8-year-old children*, which we deal with in more detail in the following parts of the study.

DIFER

The DIFER is a complex diagnostic program that consists of two parts. It contains diagnostic tests for determining the current developmental level of 4-8-year-old children, as well as methodological materials for the subsequent development of the investigated areas (Nagy et al., 2004a). The DIFER diagnostic tool was created in Hungary in 2004 as a revised form of the PREFER diagnostic tool from 1970 to determine the current developmental level of children in relation to school readiness. The research was initiated by Professor József Nagy (Józsa & Zsolnai, 2022).

Its updated version, known as DIFER, was standardized in Hungary, and with the aim of statistical optimization, a shortened version was also created (Nagy et al., 2004a). The validity and expected reliability of the diagnostic tool were confirmed by the results of tests undertaken in empirical research. The research sample comprised children from the entire territory of Hungary, who began to fulfil their compulsory school attendance in the given year (Józsa, 2014; Nagy et al., 2004b).

The DIFER tests were first presented in Hungary in 2004, and since then they have become increasingly popular among Hungarian teachers. The DIFER program was created at the University of Szeged, which has been developing

diagnostic tools in relation to school readiness for more than 40 years. The standardization of the DIFER tool in Hungary was based on the results of research in which 23,000 respondents participated (Józsa, 2022). The purpose of developing the program was to provide teachers with a tool that would help developing abilities and skills of children in kindergartens and primary schools, and which is also used as a school readiness testing tool. DIFER tests determine the current developmental level of 4-8-year-old children in seven basic areas, which can be further developed through methodical materials. Each of the individual areas, or skills, is an important prerequisite from the point of view of personal development and the successful start of compulsory schooling:

- *Fine motor skills*: in this area, the current developmental level of pre-reading and reading literacy in the field of graphomotor skills is determined - a prerequisite for successful learning to write,
- *Phoneme perception*: in this area, the current developmental level of pre-reading and reading literacy is determined - a prerequisite for the successful acquisition of reading and writing,
- *Relational reasoning*: in this area, the current developmental level of cognitive competence is determined - a prerequisite for successful understanding of the meaning of words and verbal instructions in relation to space and relations,
- *Pre-mathematics skills*: in this area, the current developmental level of mathematical literacy is determined - a prerequisite for successfully mastering the basics of mathematics, critical thinking and problem solving,
- *Deductive reasoning*: in this area, the current developmental level of cognitive competence is determined in relation to understanding the assignment and drawing conclusions based on one's own experiences.
- *Contextual understanding*: in this area, the current developmental level of cognitive competence is determined – a prerequisite for understanding certain contexts in relation to tasks being solved and critical thinking,
- *Social skills*: in this area, the current developmental level of social literacy is determined - a prerequisite for successful establishment of social relationships, cooperation with adults and peers, and

integration into a new social-school environment (Nagy et al., 2004b).

In 2017, the authors of the diagnostic tool proceeded to its expansion by two more important areas in relation to a child's thinking (Józsa et al., 2017):

- *Conceptual thinking - systematization of knowledge*: in this area, the current developmental level of cognitive competence is determined as a prerequisite for the systematization of concepts. This is necessary not only from the viewpoint of solving tasks in the field of mathematics and information processing, but is also a necessary prerequisite for the overall mastery of the content of a curriculum at the primary level of elementary schools with the aim of continuous fulfilment of the determined performance standards.
- *Combinative thinking:* in this area, the current developmental level of mathematical literacy is determined as a prerequisite for the ability to group and sort elements, which also has an impact on inductive thinking and the overall intelligence of individuals.

As we can see, the DIFER tests measure the level of a child's abilities and skills in the nine areas defined above. The tasks in this diagnostic tool have clearly defined circumstances and in most cases the children solve them individually. The tool also includes a manual that contains a methodical procedure for entering, solving tasks and evaluating answers with strictly defined rules that are described in detail in the manual with illustrative examples. They thus meet the standard requirement, which according to Bačíková and Janovská (2018) a research tool must meet in addition to variability and reliability. At the same time, this manual contains tables on the basis of which the child's resulting raw score is converted to a standard score, which is an indicator of the individual's position in relation to a representative sample of the population.

After obtaining data through test tasks, a quantitative evaluation of the results is carried out in each researched area separately. By summarizing these results, a so-called DIFER-index is created, which is expressed by a single number representing both the individual's overall developmental level and a reliable indicator of competence in relation to school readiness. Currently, there also is an abbreviated diagnostic tool available - SHORT DIFER, which allows

us to determine the results already after a single measurement (Nagy et al., 2004b).

After evaluating the results, the indicators obtained by the pedagogical diagnosis provide the teachers with possibilities of maintaining their pedagogical work in terms of setting specific goals in the field of the child's individual development. For this process, the authors developed a *Notebook of development indicators* (Nagy & Józsa, 2016), in which the results of the measurement are recorded, thus a diagnostic map of the child is formed (see Figure 1).

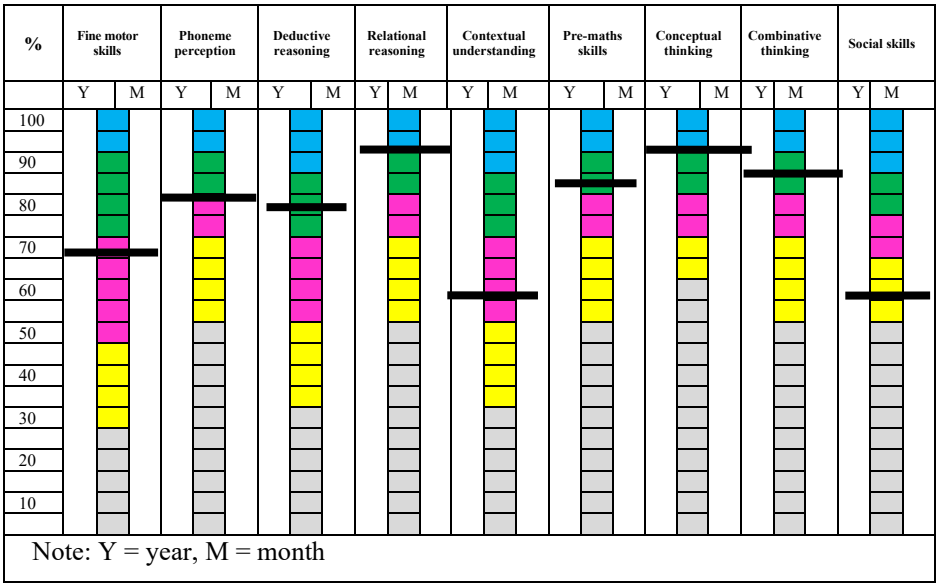

Figure 1. Diagnostic map of a child

In the map above, there are accurate data on the areas the individual is in their development and the exact areas where they require further improvement. The authors recommend the pedagogical diagnostics to be carried out at least once a year or semi-annually. The notebook of development indicators contains columns where the results of diagnostics can be recorded several times.

In favour of a qualitative interpretation of the DIFER-index, which is a numerical expression of the level of the child's abilities and skills in the measured area, the authors of the tests developed a five-stage developmental model. It means that, based on the numerical score, the child is classified into

one of the five levels of development - preparatory (Figure 1. gray colour), beginner (Figure 1. yellow colour), advanced (Figure 1. purple colour), finished (green colour), and optimal level (blue colour) (Nagy et al., 2004b). Achieving an optimal level of development is considered desirable, which means that the individual development of a child must be continued until it reaches the optimal level. In case they do not reach this level in pre-school age during pre-primary education, it is necessary to continue in the period of younger school age (Nagy, 2008), which ensures the continuity of pre-primary and primary education.

Adaptation and Standardization of the DIFER in Slovakia

As it has already been mentioned above, our research team working at the PF JSU has been dealing with the adaptation and standardization of the DIFER diagnostic tool (which has been standardized and used in educational practice in Hungary for several years) since 2021 as part of the KEGA project - *Adaptation and standardization of DIFER (Diagnostic systems for assessing development) for 4-8-year-old children*.

Conducting this scientifically oriented research project is based on the analysis of the fundamental conditions and is a response to the requirements of pedagogical practice - lack of tests that can be used by teachers to diagnose the developmental level of children in kindergartens and at the primary level of elementary school in the context of school readiness. The study is also based on the fact that in Slovakia the teachers themselves are very often the creators of tests and of various diagnostic tools, which, however, are usually not subject to verification on larger population groups (they are not standardized).

Our goal is to equip kindergarten and primary level teachers with such a standardized diagnostic tool, with which they can determine a child's current developmental level, as well as the child's level of school readiness. At the same time, we wish for ensuring that the tool could be used to verify (monitor) the individual education of children in compulsory pre-primary education in accordance with current legislation.

On the basis of the purpose of our project, we carried out empirical research in which 1609 respondents between the ages of four and eight from kindergartens and elementary schools with Hungarian as the language of instruction in the Slovakian Republic participated. In addition to the adaptation and standardization of the Hungarian research tool to Slovakian cultural and

social conditions, our goal was also to develop the diagnostic competences of students (but also of in-practice teachers). The students of the study program of Primary and Pre-school Education of the J. Selye University participated in the acquisition of research data. After theoretical preparation and provision of material and spatial conditions, students had the opportunity to apply their theoretical knowledge in practice. Since they participated in the data collection, they could get an insight into the world of research and thus acquired certain skills in the field of collecting and recording research data. Therefore, before the implementation of the research, we had modified the information sheet of the subject *Pedagogical Diagnostics*, into which work with DIFER tests had been included. At the same time, students, kindergarten teachers and primary school teachers had the opportunity to participate in educational programs and workshops, online webinars and seminars, during which they became familiar with the professional use of the DIFER research tool.

Process of the Project

As our research is focused on the adaptation of a foreign research instrument, we considered it important to follow certain steps that ensured that the given research instrument would become credible, objective, valid and reliable also in our educational environment (Fajrianthi et al., 2020). Likewise and Gavora (2012) highlight that a research tool that is not adapted to our environment is of little value, as it does not reflect our educational environment. The result of this is that it cannot produce valid data.

In this context, we implemented the adaptation of the research tool, which represents, according to Gavora (2012), the determination of edumetric qualities - validity and reliability in the target sample of subjects. This was followed by the standardization process, which included setting the standards of the adopted instrument for the given target group in our country. The adaptation process itself took place in accordance with scientific ethics, as the research tool is freely available - the authors have not limited its use. At the same time, a member of our research team is Prof. Krisztián Józsa, who is one of the authors of the original DIFER diagnostic tool. Subsequently, during the implementation of our research, we decided on the number and types of items of the DIFER research tool for the needs of kindergartens and elementary schools in Slovakia with Hungarian as the language of instruction. After

creating the items of the research instrument, we determined the subjects of the research and implemented the piloting of these items. As part of piloting, we verified the comprehensibility of the items with several subjects (23), who have similar characteristics as the target group of respondents. Based on the results, we proceeded with the following modifications – omitting one item and simplifying the expressions in three items. Subsequently, the adaptation process took place, which included determining the validity and feasibility of the research instrument. The aim of the validation was to remain as dedicated as possible to the original concept of the research instrument. However, in order for the research tool to meet the needs of the Slovakian educational environment, we specifically modified it in the context of the needs of kindergartens and elementary schools with Hungarian as the teaching language in Slovakia in the manner mentioned above. After this stage, preliminary research was conducted through which we verified the final form of the research instrument on a smaller sample of respondents with the aim of eliminating minor shortcomings. This was followed by the establishment of criterion standards for children and children aged 4 to 8 years. In the next phase, we proceeded to the implementation of the research measurement itself on a sample of 1506 respondents - children from kindergartens and children from primary schools in Slovakia with Hungarian as the language of instruction, followed by an evaluation of the results. In order to maintain the objectivity of the research findings, the data collection took place in two stages in 2021 and 2022, while the researcher's instructions were clear and identical in both measurements. The researcher did not influence the respondents' answers, and the steps in the prescribed order were followed when evaluating the results.

Measuring Validity and Reliability

The validity of the DIFER diagnostic tool was demonstrated in Hungary in several steps. Content validity was examined through reviews of a panel of experts based on a comparison with the theoretical structure of DIFER skills (as an external criterion). We would like to note that the areas measured by the DIFER tests are not determined by the curriculum and educational programs of kindergartens, but by the theoretical-psychological model of the given skill (Nagy, 2008). In Hungary, the construct validity of the tests was confirmed by factor analysis (Józsa, 2016) – during the first investigations, exploratory factor

analysis (EFA) was conducted and in later studies confirmatory factor analysis (CFA) was carried out. Concurrent validity was expressed by a correlation coefficient, where its convergence was demonstrated by a number of tests that measured the child's intellectual development (Gerebenné & Vidákovich, 1989; Józsa et al., 2022). Divergent validity was demonstrated by separation from affective variables (Józsa, 2007). The proven predictive validity of the DIFER program is extremely important for pedagogical practice. DIFER measurements have significant predictive power in preschool age for later school success (Józsa, 2014, 2016).

Based on the information provided above, it is clear that many studies have already dealt with the validation of the DIFER program in Hungary. Considering the nature of our research, we investigated the content validity of the test battery in Slovakia as part of the validation procedure. Content validity refers to the extent to which the content and structure of a research instrument match the domain that the instrument measures. According to Gavora (2012), content validity expresses the extent to which the items of the research instrument represent the properties or phenomena under investigation. At the same time, we also determined whether the content of the research tool was in line with our goal. We, similarly to Hungary, established content validity based on the opinions of a panel of experts in the field. Experts commented on individual areas, parts and specific items of the research instrument in terms of the extent to which they met their representativeness. In addition to this activity, before determining the construct validity, a factor analysis had been performed. The factorial validity of the DIFER tests was verified by confirmatory factor analysis (CFA). The quality indicators are adequate as they reach the limit values given in the literature in all cases. This means that in the case of children attending kindergartens and primary schools with Hungarian as the language of instruction in Slovakia, the validity and reliability of the tests are the same as the values obtained in Hungary. These psychometric indicators indicate that the DIFER tests can also be applied in Slovakia.

From the point of view of reliability, it is important to remember that the DIFER test system originally contained seven tests (we tested six). In 2017, the DIFER tests were expanded to include two new areas (we also dealt with these areas) – measuring the ability to systematize knowledge, abstract thinking and combinative thinking (Józsa et al., 2017). In general, we know that the

reliability coefficient expresses the extent to which the research instrument is affected by the error variance (Kline, 2000), while as Borg and Gall (1989) state, the closer the correlation coefficient is to 1.00, the smaller the error variance and the more accurately it measures the differences between respondents. As part of our research, the internal consistency of the DIFER research tool was determined, where the coefficient of internal consistency was calculated using Cronbach's alpha reliability indicator. This determines the relationships between the items of the research tool and between the research tool as a whole, or between items and a given dimension of the research instrument. According to the correlations between the items of the research instrument and the research instrument as a whole, it was shown that individual items are correlated with the questionnaire as a whole.

The values obtained by our testing and their comparison with the Hungarian results are included in the table below (see Table 1). The value of Cronbach's alpha is above 0.75 in the case of all eight DIFER tests applicable in kindergartens and elementary schools with Hungarian as the language of instruction in Slovakia, which represents a sufficiently high value.

Table 1. Reliability of DIFER tests- comparison of results in Hungary and Slovakia

Subtest	**Hungary**	**Slovakia**
Social skills	.932	.938
Fine motor skills	.865	.934
Phoneme perception	.880	.750
Pre-maths skills	.915	.949
Relational reasoning	.726	.806
Deductive reasoning	.880	.872
Systematization	.936	.936
Combinative thinking	.873	.872

The item-level reliability was analyzed by examining the reliability of omitted items. We determined the agreement between evaluators using a smaller sample of respondents (30) with the involvement of 2-2 evaluators. The reliability of stability on a sample of 30 people was also determined periodically with repeated measurements over 14 days. A good way to determine reliability is, according to Gavora (2012), repeating the assignment of the research

instrument to the same subject. The goal of our analyses was to ensure that tests with adequate validity and high reliability were also available for children of Hungarian nationality living in Slovakia. Based on the results, we concluded that the results were positive - they reached the necessary values.

CONCLUSION

Based on the data we provide above, it can be concluded that the results are positive, i.e., the validity and reliability of the DIFER tests reached the required values. As a result, the use of the DIFER diagnostic tool in kindergartens and primary schools with Hungarian as the language of instruction in Slovakia is appropriate, favourable and effective. The adaptation and standardization of the DIFER diagnostic tool will allow the teachers of the Slovakian Republic to assess not only the current developmental level of a child when determining their school readiness, but also when monitoring their individual development in the established compulsory pre-primary education.

With the outputs of our project, we can guarantee the innovation of pedagogical diagnostics at the mentioned levels of education, which will contribute to a flexible response to changes in education - in the upbringing and education of children of preschool and younger school age. At the same time, we are of the opinion that the adaptation of the mentioned tests contributes to a considerable extent to the improvement of the quality of the educational process in kindergartens and primary schools with Hungarian as language of instruction in Slovakia, as teachers will have at their disposal a standardized and research-verified tool that they can apply as part of pedagogical diagnostics. Pedagogical diagnostics in the educational practice of pre-primary education will not be based only on the opinions of the teachers without objective measurements. After the successful adaptation and standardization of the DIFER tests for kindergartens and primary schools with Hungarian as the language of instruction in Slovakia, we are considering creating a Slovakian version of it in the future for the needs of teachers of kindergartens and elementary schools with Slovakian language of instruction.

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A Comparative Analysis of Hungarian and Slovakian Preschool Curricula

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ABSTRACT

The study compares preschool educational programmes in Hungary and Slovakia. Both countries have a national core curriculum for preschool education, which are curriculum frameworks. It means that both countries provide space for a diversity of preschool programmes. However, the Slovakian programme is considerably longer and more detailed than the Hungarian one. The expected learning outcomes and requirements are precisely and thoroughly defined in the Slovakian programme. A comparison of the curricula points out that there seem to be more differences than similarities between them. The two documents show a considerable difference, which may also have implications for the practice of educating and developing preschool children. There is a fundamental difference in thinking about children's activities (especially their play), the development of skills and abilities, and the transmission of literacy content. Further analysis may help to understand how these differences affect children's development.

Keywords: Hungary, Slovakia, Preschool Curricula, DIFER, content analysis

INTRODUCTION

The DIFER measurements comparing Hungarian preschool children who reside in Hungary and in Slovakia (Nagy et al., 2004), reveal an unexpected result. Surprisingly, the development of children's skills at the end of preschool presents a different scenario compared to the measurements taken at the age of 4 years. At the age of 4, there is no substantial difference between the two countries. By the end of preschool, the DIFER skills of children in Hungary are significantly more developed than those of their Hungarian counterparts in Slovakia (Hajduné Holló et al., 2022). In order to explain this phenomenon, first, the two countries' basic preschool curricula were examined. Through the comparative analysis, the study aims to highlight the similarities and differences between the state regulatory documents of the Hungarian and Slovakian bipolar models, the National Core Curriculum for Preschool Education and the State Education Programme for Preschool Education.

First, it was determined that the compulsory document regulating the content of preschool education functions as a framework for regulation in both countries. Curricula of the basic programme type are not intended to enforce a compulsory and generalised preschool pedagogy but to provide space for a diversity of educational programmes and their coexistence. The basic characteristic of their regulatory role and their genre is that they provide a framework and general principles which serve as a basis for preschools to develop their own educational programmes. Since the curriculum is a dynamic and open model of objectives and processes based on social consensus, which is, in fact, a consistent system of several dimensions, it is characterised by the fact that it anticipates expectations for the optimal implementation of the educational process. The curriculum usually contains a complete, mainly vertical description of the teaching and learning process, from objectives to assessment (Perjés &Vass, 2022). Education systems where a local curriculum is used alongside the core curriculum are bipolar systems. The education systems in Hungary and Slovakia are bipolar.

In Hungary, the obligation to develop institutional pedagogical programmes appears alongside the national core curriculum for preschool education. The Hungarian core curriculum of preschool education is a document characterised by pluralism, child-centredness, methodological freedom and organisational diversity. Its unique features are the formulation of the image of the child and

the preschool, the focus on activities, including games, and the fact that the programme does not contain any requirements, the developmental characteristics of the end of preschool being the guiding principle for educational development.

Education policy in Slovakia is also characterised by the bipolar model, but here the criteria-based education system is more pronounced, where the state prescribes the fulfilment of a set of requirements set by the educational programmes, standardising the expected learning outcomes and the level of skills to be acquired in preschools within the school system. The backbone of the Slovakian core curriculum is a triad of requirements, curricular content and assessment questions. The Slovakian programme is therefore structured on the basis of the practice of criterion-oriented developmental support so that the performance can be defined and assessed in relation to the requirements, and in order to assess the level at which the child/student has reached the predefined, well-defined level of requirements. The criteria-based assessment also allows to characterise the cognitive skills that the individual is able to show at the level achieved. This provides an opportunity for comparison and, on this basis, for the development of the child/student in a given area.

The Origins of Content Regulation in Preschool Education in Hungary

In Hungary, the document that can be seen as the first attempt to regulate the content of preschool education as a whole was written in 1957. Instruction No. 851-17/1957 II/4 of the Minister of Education, issued in all preschool institutions of the country, entitled "Educational Work in Preschool - Guidelines for Preschool Teachers" became known as a handbook within the profession. The manual is a highly detailed, prescriptive curriculum-type document that regulates the content of the whole teaching and learning process and is structured into two major sections. The first part covers the conditions and tools of preschool education, and the second, more extensive part, details the activity plans. Overall, the structure is similar to that of school curricula: it specifies the content and structure of the activities and the requirements for each age group.

The document is a faithful reflection of its time, so it is not surprising that it is politicised. Thus, according to the do cument, the aim of preschool education "is to provide care and education for children aged 3-6 years in accordance with

the requirements of a society building socialism and socialist pedagogy" (Educational Work in Preschool, 1957, p. 3). Further, the task is the multifaceted education of children, which is to be provided through the development of their physical, intellectual and moral strength and their aesthetic sense. It should aim to develop the skills and abilities which will facilitate their integration into school life and the start of their school education. The structure, content and overall approach of the document reassure the reader that the first programme, which seeks to regulate the whole of Hungarian preschool education, is strongly education-centred and focuses on preparing children for school. Preparation for school will remain one of the functions of the preschool in the future, but the spirit of the programme launched in 1971 after some three years of professional debate and discussion, is different. It has been rightly regarded as a milestone in the profession.

The greatest merit of this programme was that it represented the most up-to-date psychological approach to the concept of children (the programme was strongly influenced by the spirit of the Budapest School and the proposals of Alice Hermann, a direct member of the Programme Committee), and incorporated available expertise in pedagogy, psychology, medicine and health sciences, and combined it with practical experience. The 1971 programme was, therefore, a curiosity for its time and gained an international reputation (Bakonyi, 2013). The individual approach, experience, the opportunities for self-expression and indirect learning through play, the emphasis on the informality of learning for the youngest children (The Preschool Education Programme, 1980/Az óvodai nevelés programja, 1980), the thinking about individual rates of child development and differentiation resulted in very modern approach to education, which was well supported by the proposed guidelines that appeared alongside the compulsory standards.

For preschool teachers, prescriptive formulations are more about the objectives ('what'), while suggestions are more about the methodological issues ('how'). The structure of the programme has been modified somewhat, but this has not brought about any significant change in the structure. The individual chapters have become more proportionate, while the levels of requirements to be attained by the end of the year have been retained for each age group, but these have been treated in a much more flexible way, taking into

account the natural differences in development between children (The Preschool Education Programme, 1980).

Work on the revision of this landmark programme started in the first half of the 1980s. There were a number of factors that justified this renewal, of which only the most important ones will be mentioned:

- Recent research findings on school readiness (Nagy, 1985)
- The 1985 Act on Public Education and the regulation of schooling according to development (The Education Act of 1985 = Hungarian Gazette/Magyar Közlöny, 1985/19. 461-49)
- Changes in society, and
- The profession's increasing aspiration for pedagogical autonomy.

The 1989 preschool education programme (Hungarian abbreviation: new ÓNP) retained many of the values of its predecessor but also introduced important changes. The most striking changes are in the openness and the loosening of the ties in preschool life. Instructions ('must') have been replaced by recommendations ('may'). Recommendations are made on what can be done, and the methods (e.g., 'how to do') are left to the preschool teachers, as well as the choice of the forms of experience. This has led to much greater methodological freedom. It is also a significant change that the programme no longer sets any standards but, instead, the guide for preschool teachers from this point onwards is the developmental characteristics.

In the definition of the objective, the 1971 programme retains "the promotion of the multifaceted, harmonious development of children" (The Preschool Education Programme, 1980), but no longer only for children aged 3-6, but for children aged 3-6-7. The clarification of the age limits reflects that some children do not start school at the age of 6 and those children reach the developmental stage necessary for starting school at different ages. 'Multifaceted' means that education must embrace the whole of the child's personality and ensure physical, intellectual and social development within a framework of emotional security. Therefore, preparing for school takes on a new meaning: preschool develops the whole person, part of which is achieving school readiness, which is ensured by carrying out the tasks assigned. The tasks of preschool education in the fields of physical development, mental and intellectual development, and social and community development are clearly and precisely defined in the programme. The areas identified are the same as

for school readiness. Still, the programme emphasises that the content of preschool education is broader than this. At the same time, it indicates that the development of learning skills in the process of overall personal development is meant to be the feedback on the effectiveness of preschool education.

The revised educational programme was published as a unified, centralised guide for all Hungarian preschools at the time of the regime change when the demand for professional diversity had already stimulated the reform of pedagogical concepts and alternative programmes. Bakonyi aptly points out the contradiction that, while the profession's aspirations suggested a new era, until 1996, a 'past-system' central programme functioned as the official content regulator (Bakonyi, 2013).

The Introduction of Framework Regulation

The National Core Curriculum for Preschool Education (1996)

The core curriculum is an entirely new type of content regulation since it not only aims to enforce a compulsory and generalised preschool pedagogy but also provides space for the diversity and coexistence of educational programmes. Its regulatory role and genre also differ significantly from previous programmes. It provides a framework and general principles that serve as a reference point for all local preschools to develop their own educational programmes. It preserves the good traditions of preschool education while reflecting the democratic and human values legitimised due to societal changes. It is a document characterised by pluralism, child-centredness, methodological freedom, and organisational diversity. It reflects the general demands that society makes of preschool education, taking into account the child's interests.

A completely new element in the core curriculum is the image of the preschool and the image of the child. The image of the preschool determines its place, functions, objectives, principles, and tasks. In the definition of the objectives, the familiar goal of promoting the multifaceted, harmonious development of children and the unfolding of their personality is supplemented by "taking into account age and individual characteristics and different developmental rates (including the care of children with special educational needs)" (Government Decree of 137/1996 (VIII/28) on the publication of the National Core Curriculum for Preschool Education). The addition of age and

individual characteristics to this goal aligns with the human rights and freedoms declared in the current Public Education Act (Act LXXIX of 1993 on Public Education), as well as with the pedagogical principles and the child's vision of the core curriculum. The latter explicitly emphasises that children have specific physical and psychological needs, which vary from age to age and from one individual to another. For the first time, the aim of preschool education is formulated so that it can be extended to children with special educational needs. Behind this humanist approach, there is a social concern about integrating people with disabilities into society and reducing their exclusion. Overall, the goal also reflects the valorisation of the unique personality of the child, the individual.

The general task of preschool education in this basic programme is to meet the physical and psychological needs of the preschool child, including:

- The development of a healthy lifestyle,
- To provide emotional education and socialisation, and
- Intellectual development and education.

The tasks in the different areas are defined in more detail in the document but in such a way as to ensure flexibility for each institution.

Introduced in 1996, it is Hungary's first content regulator of the preschool curriculum type. The Public Education Act required preschools to prepare a local programme based on the national programme by the autumn of 1998. This was a fundamental change from previous practice, but overall, it fitted in well with the decentralising tendencies of the period. The revision of the core curriculum took place first in 2009 and then in 2011. The features of the current legislation are summarised below.

The National Core Curriculum for Preschool Education Today

Act CXC of 2011 on National Public Education defines that preschool educational work is carried out according to a pedagogical programme. It also states that preschools prepare their local pedagogical programme based on the National Core Curriculum for Preschool Education (Act CXC of 2011 on National Public Education). The law makes the two-level regulation clear but does not provide for the structure of local programmes. The rules on the content, preparation and use of documents defining the operation of educational institutions, including preschools, are set out in EMMI Decree No. 20/2012

(VIII. 31.) on the Operation of Educational Institutions and the Naming of Public Educational Institutions. The National Core Curriculum for Preschool Education is included in Annex 1 of Government Decree No. 363/2012 (XII. 17.), and the guidelines for the preschool education of nationalities are contained in EMMI Decree No. 17/2013 (III. 1.).

The National Core Curriculum for Preschool Education is a framework regulatory document that serves as a content guide for all preschools in Hungary. In addition to defining the current (age-appropriate) image of children and preschools, it sets out the basic principles of pedagogical work in Hungarian preschools. It contains the general tasks of preschool education, including developing a healthy lifestyle, emotional, moral and value-oriented community education, and implementing mother tongue and intellectual development and education. The section on the principles of the organisation of preschool life covers not only the staff and material conditions but also the relations within the preschool. The programme specifies the types of activity and the tasks of the preschool teacher in each of these areas. The most important and developmental activity of early childhood, 'play' is mentioned first among the activities and is the most effective means of preschool education.

Activities in preschool life:

- Play
- Poetry, storytelling
- Singing, music, singing games, children's dance
- Drawing, painting, pattern-making, handwork
- Physical exercises
- Active learning about the outside world
- Work-related activities
- Learning through activities.

Given its child-centred approach, the intention to develop personal competence is embedded in the programme, and expectations and guidelines to support development are also documented throughout. The authors of the programme state in the introduction that "preschool education should be aimed at promoting the full development of the child's personality" (Government Decree No. 363/2012 (XII. 17.) on the National Core Curriculum for Preschool Education). The child's personality cannot be fully developed without developing the components of personal competence. These needs are already

reflected in the child's image and the image of the preschool, the latter also including the preservation and strengthening of the self-identity of children of ethnic origin and migrants.

One of the objectives of the preschool education process during compulsory preschool education from the age of three is to promote the child's social development. The chapter of the programme that focuses on supporting the development of social competence is consistent with the section on moral and value-oriented community education, but because of the community character of preschool education, tasks related to the development of social competence are systematically reflected in other chapters of the programme.

The chapter containing the implementation of the mother tongue, intellectual development and education focuses on the development of cognitive competences. Among the tasks of cognitive education, the regulatory document mentions the systematisation, expansion and practice of the child's spontaneously and systematically acquired experience and knowledge, as well as the development of cognitive abilities (perception, sensation, memory, attention, imagination, and thinking). In addition to the predominance of free play, most guidance on the development of the components of cognitive competence is provided in the sections on active learning about the outside world and learning through activities. In addition to playful, action-based learning, practical problem-solving is also included among the possible forms of learning. Mathematics education was still a separate educational area in the 1989 Early Years Education Programme, but in the current programme, it is part of the activities of active learning about the outside world: "In the process of learning about the environment, the child acquires mathematical experiences and knowledge and applies them in his/her activities." (Government Decree No. 363/2012 (XII. 17.) on the National Core Curriculum for Preschool Education).

The core curriculum is very vague about the evaluation of preschool education and only contains references to it. In formulating the aim of preschool education, the programme's authors clearly state that the multifaceted, harmonious development of preschool children, the development of the child's personality and the reduction of disadvantages should consider the age and individual characteristics and different developmental rates. However, no guidance has been given on what can be used as a source of information to understand children and how their development can be characterised in relation

to themselves and society. In the section on the organisation of preschool life, there is a mention of the need to know children and to monitor their development, but reference is made only to the obligation to keep the "various" documents for this purpose. Explicitly, Sections 63, 93/A, and 173 of EMMI Decree 20/2012 (VIII. 31.) lay down the rules on the obligation to monitor progress, its written form, frequency and the content of the documentation kept (EMMI Decree 20/2012 (VIII. 31.) on the Operation of Educational Institutions and the Naming of Public Educational Institutions). The most specific expectation for assessment is contained in the last point of the sub-chapter of the basic programme on learning in activities as follows: "The preschool teacher shall support the development of the child's personality through personalised, positive assessment in the management of learning." (Government Decree No. 363/2012 (XII. 17.) on the National Core Curriculum for Preschool Education).

The final part of the National Core Curriculum for Preschool Education summarises the physical, mental and social development (maturity) needed for school entry at the end of preschool but does not include requirements.

The Road to Framework Regulation in Slovakia: The History of Content Regulation in Preschool Education

The beginnings of institutional preschool education in Slovakia date back to the 1950s (when the country was still part of Czechoslovakia). Crèches (which catered for children up to the age of 3) and preschools (which took children from 3 to 6) were run under strict state regulations. The beginning of independent preschool education in Slovakia dates back to the foundation of Slovakia (which became an independent state on 1 January 1993).

Historical Review

From the foundation of Czechoslovakia until 2013, twelve programmes for preschool education were published (Uváčková, 2013). The current state programme is, therefore, the thirteenth. The first centralised curriculum was developed in 1948. The Education Programme for Crèches and Preschools– Program výchovnej práce v jasliach a materských školách (Kolektív autorov, 1978), published in 1978, was in force until 1999. This document is regarded as the first qualitative attempt to regulate the content of preschool education as

a whole, and even regulated preschool education in independent Slovakia for 6 years after the breakup of Czechoslovakia. Based on this document, strict rules prevailed in preschools. There were two sessions a day in the morning, with strict time limits (usually 2x20/25 minutes), and frontal activities predominated. It is regrettable that this was the first and last state programme that the state considered important to publish in Hungarian. It was published in 1986 in the language of the Hungarian minority under the title "The Educational Programme for Crèches and Preschools" (in Hungarian: A bölcsődék és az óvodák nevelési programja).

This was replaced in 1999 by the Programme for the Education and Teaching of Children Attending Preschool – Program výchovy a vzdelávania detí v materských školách (Guziová et al., 2021), the first programme of its kind in independent Slovakia, a milestone in Slovakian preschool education, which, although based on the national and pedagogical traditions of the time, represented the most modern psychological approach to children at the time. The programme distinguished the following educational areas: physical education, work education, prosocial education, intellectual education, and aesthetic education. Within each of these areas, the content of preschool education was differentiated according to age. The document is characterised by gradually moving away from frontal activities towards group organisation. Play, morning exercise sessions, spending time outdoors, and didactic activities were the main features of the programme. The latter emerged as a new and hitherto unknown concept. The work of the preschool was planned based on the programme. The objectives and tasks were set by the preschool teacher according to the age of the children and selected from the programme. This programme is considered one of the best by teachers who have experienced the introduction of several programmes.

2008 brought about radical change with the reform of the school system and the introduction of the new Public Education Act. With the entry into force of the Public Education Act No 245/2008 (Zákon č. 245/2008 Z. z. o výchove a vzdelávaní (školský zákon) a o zmene a doplnení niektorých zákonov, 2008), a two-level/bipolar, participatory management- curricular model, previously unknown in Slovakia, was introduced.

The 2008 reform brought preschools into the school system (level 0: ISCED 0) and introduced new (mainly foreign) terms into the professional vocabulary,

such as education, pre-primary education, educational programme, evaluation, and educational standards. The National Educational Programme was named ISCED 0 – 'The Child and the World' (Štátny vzdelávací program ISCED 0- 'Dieťa a svet') (National Institute for Education, 2008/ Štátny pedagogický ústav, 2008). The educational standards were identified in three main areas: psycho-motor, cognitive and socio-emotional, and integrated into four thematic areas: I am, People, Nature and Culture. The literacy standards were further divided into requirements (performance standards) and content standards. The radically different structure from the previous programme, the incoherence of the thematic units – competences – content units – cross-cutting themes (between which a link should have been found when planning), the obligation to operationalise the objectives linked to the performance standards in an illogical way, led to dissatisfaction among educators. As a result, chaos began to reign in both the planning and the implementation of activities.

The futile search for correlations, the chaotic use of concepts and the lack of professional guidance negatively influenced the programme's fate. We now know that most teachers considered the programme inadequate (Kaščák, 2013), which has also affected the quality of programmes at the institutional level. They were difficult to develop and lacked methodological support and guidance. In response to this sudden change, teachers had to develop their institutional programmes over the summer in order to have them ready by September. The main problem was the development of the curricular framework (učebné osnovy), a compulsory part of the institutional programme. The publication of the methodological guide/manual was delayed, as the teacher training (which only started in the autumn of 2008). However, the local-level programmes had to be ready by 31 August and the work under the new programme had to start from 1 September.

However, the biggest problem with the Public Education Programme of Pre-Primary Education was the lack of continuity between the different levels of institutional education (preschool and primary school). Professional criticism also affected this area. Research has also confirmed that teachers in the profession described this document as a chaotic, ill-conceived document that did not meet expectations and only complicated their work (Miňová, 2013). It is, therefore, fair to say that the 2008 state programme was one of the significant failures in the history of preschool programmes in Slovakia. Kaščák (2013)

points to the problem that standardisation was part of the Anglo-American culture until then and that it was not a European tradition, so the transition was not easy. This was compounded by inadequate training for teachers and delays in training and methodological guides. As a result, the period was experienced by preschool teachers as chaotic.

For the reasons mentioned above, the programme's creators initiated a revision in 2011. First, a professional discourse at the societal level was developed, involving professional organisations and inspired by comparative analyses of other countries to renew the highest curricula. Then, under pressure from the profession, a new programme was developed. The result was the new state curriculum (inovovaný Štátny vzdelávací program) in 2015, which was structured in a way that was completely different from its predecessor, retaining only the idea of educational standards, broken down into performance and content standards. The experimental testing of the new programme lasted one year (in the 2015/2016 school year) and involved 306 preschools. Several changes were made to the original document by the authors. Finally, after the pilot phase, the state curriculum that is still in use today was implemented in 2016.

The State Educational Programme for Pre-Primary Education Today

The upper level of the two-level curricular model based on standardisation is currently the State Educational Programme for Pre-primary Education (Štátny vzdelávací program pre predprimárne vzdelávanie v materských školách), developed by the National Institute for Education (Slovakian abbreviation: ŠPÚ). The new regulator entered into force on 1 September 2016, following the approval by the Ministry of Education on 6 July 2016. The second level is represented by the institutional (local) pedagogical programmes, which all institutions are obliged to develop in accordance with the law in force and the state curriculum.

The programme is also available in Hungarian, translated in 2019 by the Comenius Pedagogical Institute in Komárno, Slovakia. The Institute is a non-profit NGO supporting the professional development and training of Hungarian teachers in Slovakia. The proofreading was carried out by lecturers from J. Selye University in Komárom, Slovakia. "Through this programme, the state guarantees the quality of institutional preschool education in all preschools in

the network of schools and educational institutions in the Slovakian Republic" (State Educational Programme for Pre-Primary Education, 2019, p. 6).

The state programme is a framework regulatory document which must be applied in accordance with the current law on public education. It defines the basic state requirements for institutional pre-primary education and provides the basis for further levels of institutional education. It sets out the objectives and content of public pre-primary education. It provides the basis for establishing institutional (establishment-based) education and training programmes while ensuring the conditions for independent planning and implementation. It emphasises the role of pedagogical evaluation and stresses the need for inclusive education.

In Slovakia, the main goal of preschool education and teaching, as set out in the state curriculum, is to achieve the optimal level of cognitive, sensorimotor and social-emotional development that is the basis of school and social life. By completing the programme, children usually reach school readiness by the end of their final year of preschool, having acquired the skills and competences they will need throughout their lives.

Key competences covered by the programme:

- Communicative competences
- Mathematical, scientific and technological competences
- Digital competences
- Learning to learn, competences of problem-solving, creative- and critical thinking,
- Social and personal competences
- Civic competences
- Work competences.

Preschool education is divided into cultural areas. The highly detailed curricular content of the interpenetrative areas covers the entire content of pre-primary education. The following literacy areas (which are coherent with the literacy areas of the primary school) are further subdivided into units, sub-areas:

- Main objective is to develop the child's communicative competences at all language levels, using the strong influence of written language.
- *Mathematics and information management*: aims to provide the mathematical and information technology knowledge and skills that

underpin the mathematical thinking and competences to be developed at higher levels of literacy.

- *Man and nature*: its main objective is the early development of scientific literacy.
- *Man and society*: the main aim is to enable the child to find his/her way in his/her social environment and relationships in time, space, and social and human relations. It focuses, in particular, on the social environment and aims at pro-social education.
- *Man and the world of work*: the main objective is to develop the child's basic skills to enable him/her to carry out daily activities and to use the tools of everyday life.
- *Art and culture*:
    - Music education: the main objective is to develop the child's general musical abilities, skills and habits, which lay the foundation for later musical understanding.
    - Visual arts education: the main objective is to develop the child's imagination through the expression of simple visual arts through playful, creative activities with materials and tools, as well as the development of imagination, creativity and basic visual arts habits, skills and abilities.
- *Health and physical activity*: the main objective is to provide the basic information about the health while developing and improving the child's motor skills through appropriate physical exercises (State Educational Programme for Pre-Primary Education, 2019).

The specificities of each cultural area are presented in a multi-level breakdown. The structure of the curricular requirements is illustrated in Table 1, using the most structured field of education – Language and Communication – as an example.

Table 1. Structure of the curriculum requirements (State Educational Programme for Pre-Primary Education, 2019).

Cultural area	Sub-area	Sub-area unit	Sub-area unit branch
Language and communication	Spoken language	Articulation and pronunciation	
		Grammatical correctness and literary (standard) language variants	
		The rules of communication	
	Written language	Understanding the content, meaning and role of written language	Learning about the functions of written language
			Understanding the direct meaning of the text – vocabulary
			Understanding the indirect meaning of the text
			Knowledge of genres and signs of written language
		Understanding the formal features of written language	Printed forms and the use of books
			Phonological processes and the development of phoneme perception
			Fine motor conditions for writing

The programme's backbone is a triple unit of requirements – curricular content – assessment questions. The requirements set out the level of skills to be achieved by the end of preschool (as an output of pre-primary education). The curricular content provides guidance or methodological recommendations for preschool teachers. Finally, assessment questions, which appear alongside the skills to be acquired and the literacy content (literacy standards), are used as an internal assessment tool for institutions to monitor progress, plan more effectively, and support individual learning.

It is important to note that monitoring progress and its implementation and recording using the tools of pedagogical diagnostics was not compulsory until

2020 and was not part of the pedagogical documentation. However, from 2022, according to Government Decree No. 21/2022 (Decree on Pedagogical Documentation and Other Documentation), the teacher must make records within the framework of pedagogical diagnostics. However, there are currently no other conditions or restrictions in this respect (Vyhláška č. 21/2022 Ministerstva školstva, vedy, výskumu a športu Slovenskej republiky zo 17. januára 2022 o pedagogickej dokumentácii a ďalšej dokumentácii).

The programme emphasises that the language of education in the Slovakian Republic's preschool network is the state language. Communication in Slovakia is also part of the educational activity in preschools with national and bilingual education. The main guidelines for communication in the state language in minority preschools are set out in a methodological guide issued by the National Institute for Education (Metodický list na osvojovanie štátneho – slovenského jazyka v materských školách s vyučovacím jazykom národnostných menšín, 2016).

Forms of activities of the preschool life based on the Slovakian programme:

- Games and activities freely chosen by the children
- Health promotion exercises
- Cultural activities
- Outdoor activities
- Lifestyle activities (National Institute for Education, 2016).

The teacher adapts the forms of activities to the current situation and the needs and interests of the children at his/her discretion.

Local Pedagogical Programmes

Local Pedagogical Programmes in Hungary

Based on the core curriculum, preschool teachers prepare local educational programmes or adapt existing ones. Regardless of which version a preschool prefers, the national basic programme for pre-primary education and the local pedagogical programmes must be coherent. Local education programmes at the institutional level, generally based on situation analysis, contain the educational concept, objectives and tasks of the preschool concerned and the values defining its educational principles. They also include measures to alleviate social disadvantages and activities linked to child protection, measures to

promote equal opportunities for children, forms of parent-child-educator cooperation, the principles of a healthy lifestyle and environmental education, and related programmes and activities. In the case of children with special educational needs, special development activities to reduce the disadvantages resulting from special educational needs are also part of the local educational programmes. The pedagogical programmes of pre-primary schools with ethnic preschool education have to provide tasks related to the cultivation of the culture and language of the ethnic group. In addition to the above, the local pedagogical programme details the content of development and describes the process of its development. It sets out the organisational limits and timeframes and the monitoring and evaluation system. It takes account of the material and human resources needed to implement the programme and organise the life of the preschool.

Local Pedagogical Programmes in Slovakia

According to the Act of the National Council of the Slovakian Republic No 245/2008 on Public Education, education in schools (from 2008, preschool is included) and educational establishments is based on educational programmes. Therefore, the educational programme must be prepared in accordance with the principles and objectives of education laid down in the Public Education Act. The educational programme is developed by the educational establishments of schools (school children's club, dormitory, leisure centre) and the teaching programme, by preschools and schools.

The curriculum for preschool education – either the institutional pedagogical programme or the school/preschool educational programme –is the regulatory document of the preschool concerned, which is based on the state educational programme and takes into account local specificities. From 1 September 2009, all preschools must have an educational programme, prepared by the community of preschool teachers, discussed by the pedagogical council and school council, and issued and published by the director of the institution.

The law also allows preschools to have an international programme as long as it is in line with the principles and objectives of the national law on public education. In this case, a written declaration of consent from the Ministry of Education is required. The preschool programme may also be a programme that has been approved as a result of pedagogical experiments. In all cases, however,

in Slovakia, the state and local pedagogical programmes must be coherent. Regardless of which version is preferred by a particular preschool, local programmes should be developed/implemented at the institutional level based on a situation analysis.

According to Article 7 of the Public Education Act 245/2008, the preschool educational programmes, in addition to the mission statement, the profile of the preschool and its objectives, include the name of the programme, the forms of education and teaching, the duration and the language of education. A system of assessment of children is also a compulsory element. Furthermore, the document must define the specific objectives and mission of the education and training and indicate the level of education attainable by completing all or part of the institutional curriculum (Zákon č. 245/2008 Z. z. o výchove a vzdelávaní (školský zákon) a o zmene a doplnení niektorých zákonov, 2008. §. 7). In preschools where children with special educational needs are also educated, the relevant chapter may also be part of the programme (but is not obligatory).

The framework curriculum of the institution is a compulsory part of the educational programmes. However, the framework curriculum of preschools can be the same as the literacy standards for each area of the current state curriculum (requirements + curriculum content). The requirements are specified in the performance standards within each literacy area. In this case, referring to this in the institutional programme is sufficient.

According to Article 12 of the State Educational Programme for Pre-primary Education, the institutional programme must also include the starting points for planning. In this section, the preschool specifies the form in which it will plan and the compulsory content elements of the planning. The plans are usually based on adaptations of the performance standards (requirements) of the current state curriculum, which, in fact, implies the delimitation of the levels of skills to be acquired. In Slovakian preschools, teachers usually prepare weekly thematic plans or project plans.

The thematic or project plans include, in addition to specific objectives based on the corresponding level requirements, strategies, methods, activities (actions or curricular content), learning resources and forms of the organisation according to the weekly theme or project topic. The form and content of the plan are the competence of the preschool, and thus the plans of each institution may be completely different (Szabóová, in Orsovics et al., 2018).

In Slovakia, under current legislation, children aged 2 years can be admitted to preschool next to children aged 3-6, provided that the conditions are right. If the child is not ready for school even after the age of 6, the director of the preschool decides to extend compulsory preschool attendance based on a request from the child's legal representative and the submission of the necessary documents (psychological report and recommendation from the general practitioner). (Until 2021, when preschool attendance was not compulsory, it was the school director who postponed the start of compulsory school attendance.) Children with a decision may continue to attend preschool.

On successful completion of the final year of the preschool education programme, the child obtains a preschool qualification. The certificate of qualification is issued in the official language, or bilingually in the case of national preschools, which is compulsory from the school year 2021/2022 (previously, it was only issued at the parent's request). It is also necessary to mention the amendment of Law 245/2008 on public education for 2021, which entered into force in September 2021 and impacted the establishment of institutional pedagogical programmes. Not only did it change their structure slightly, but it also introduced the concept of individualised education and made it compulsory for children to attend preschool for one year before starting school in September 2021.

A Comparative Analysis of Preschool Curricula

Besides emphasizing the fundamental differences between the content of the regulatory documents in Hungarian and Slovakian preschool education, the common features of the programmes will be mentioned too.

The current National Core Curriculum for Preschool Education in Hungary entered into force on 1 September 2013, while the State Educational Programme for Preschool Education in Slovakia entered into force on 1 September 2016. The two programmes are compared based on the following criteria:

- Designation
- Length
- Structure and content
- Daily schedule and forms of activity
- Key competences

- Provision for children with special educational needs
- The role of play
- Physical activity and a healthy lifestyle
- Ethnic aspects
- Methodological freedom
- The relationship between national (core) programmes and institutional/local programmes.

Designation

In the case of the Hungarian programme, the name itself (National Core Curriculum for Preschool Education/Óvodai nevelés országos alapprogramja) reflects an educational focus. On the other hand, in the Slovakian programme, the name (State Educational Programme for Preschool Education/Óvodai nevelés állami oktatási programja) focuses on teaching, which may be related to the fact that in Slovakia, preschools are part of the school system.

Length

The difference in size of the two documents is striking and significant. The State Educational Programme for Preschool Education is ten times the size of the National Core Curriculum for Preschool Education. Two-thirds of the 112-page Slovakain document is a set of standards and assessment questions in tabular form, developed on three levels, in which the triple unit of requirements – curricular content – assessment questions are presented within each cultural field. The 11-page Hungarian core document does not contain any requirements.

Structure and content

The Hungarian document is structurally divided into 6 main chapters whereas the Slovakian one is divided into 12. The common feature of the two programmes is that they contain requirements on the provision of staff and material conditions in preschools and the organisation of preschool life. In the Slovakian document, the latter is summarised as operational conditions. Both regulatory documents of a framework nature contain guidelines for the preparation of institutional pedagogical programmes. Both documents set out the characteristics of the types of activities, but the Hungarian programme also

describes the tasks of preschool teachers in relation to each activity. In the Slovakian programme, this part of the curriculum is more specific and detailed within each cultural field, which can be interpreted as methodological guidance for teachers. The two basic programmes are more similar in terms of principles, objectives and tasks, but there are also differences in content. In addition to setting out the principles, the National Core Curriculum for Preschool Education allows for innovative approaches and ensures methodological freedom for preschool teachers. In the case of the Slovakian programme, the more rigid structure suggests the opposite.

The differences between the two programmes are substantial. The school leaving certificate for children who have completed preschool education appears only in the Slovakian document. There is no such document in Hungary. A specific feature of the Hungarian programme is the mention of the image of the child and the preschool, which also sets out the aims and principles of pre-primary education. In the Slovakian programme, only the graduating child's profile is available. The Hungarian document includes the principles of the organisation of preschool life among its principles whereas the Slovakian programme does not contain any principles or expectations in this respect. The fundamental difference in content is that the National Core Curriculum for Preschool Education pays particular attention to the role of free play. In contrast, the State Educational Programme for Preschool Education places less emphasis on this area.

The Hungarian programme emphasises the importance of developing a healthy lifestyle within the tasks of preschool education and highlights its main guidelines. It also describes the focus of the implementation of emotional, moral and value-oriented community education, as well as of mother tongue and intellectual development and education. In the Slovakian programme, these tasks are incorporated in detail into the requirements for each field of cultural areas.

The two programmes define the characteristics of development by the end of the preschool years in very different ways. The Hungarian document summarises this briefly but comprehensively in Chapter VI of the government decree. The Slovakian programme defines it in much more detail, in the form of requirements within each cultural area. There is an annex to the programme in the form of methodological material (Adaptácia výkonových štandardov,

2016), which summarises the characteristics of development in the form of requirements, broken down into levels based on the age specificities of preschool children (with a focus on the stages of development based on the characteristics between 3-6 years). The Hungarian document does not include the learning outcome requirements nor the curricular content and assessment questions. The development of skills and competences is emphasised in both programmes, even if the expectations are defined differently.

Scrutinising the content of the programmes, it can be concluded that the name of the Slovakian programme is reflected in the content: education is less prominent than teaching. It can also be stated that the Hungarian programme is more child-centred and gives greater space for methodological freedom.

Daily schedule and forms of activity

The names of the forms of activity are entirely different in the two countries. While the Slovakian naming emphasises the formal aspect of the implementation of the activity, the Hungarian one stresses the orientation and content of the activity itself. As for correspondences, these designations reflect the content components of the Slovakian programme's cultural areas (e.g., poetry, storytelling = Language and communication; singing, music, singing games, children's dance = Music education; drawing, painting, pattern-making, handwork = Art education; exercises = Health and physical activity; active knowledge of the outside world = Man and nature and Man and society; work-related activities = Man and the world of work). It is noteworthy that in the Hungarian core curriculum, learning through activities is given special attention, and a special place is given to play.

In both programmes, the daily schedule is adapted to the child's needs and the different activities, taking into account local customs, needs and interests. The Hungarian programme draws attention to the importance of creating a harmonious balance between activities, bearing in mind the prominent role of play. The schedule is developed by the preschool teachers of the children's group. The Slovakian programme does not use the term weekly schedule.

Both programmes refer to the various mandatory documents that are used to plan preschool education and children's development. These are specified in other legislation. While the Hungarian document focuses on getting to know the children, monitoring their development and the related documentation, the

Slovakian document emphasises this in a completely different way. The diagnostic function is supposed to be served by the evaluation questions, although this is not explicitly stated in the documentation.

Key competences

In Hungary, the terminology of preschool education is not rigidly aligned with the conceptual framework of the national curriculum, so the concept of key competences is not explicitly included in the core programme. In contrast, the Slovakian document puts more emphasis on this by presenting some of the essential elements of competences transformed into requirements as if they were educational outcomes.

Provision for children with special educational needs

The guidelines for (co-)education and equal opportunities for children with special educational needs are summarised in a separate chapter of the Slovakian programme. In Hungary, the guidelines are contained in a separate law. Still, the core programme's definition of the aim also takes into account children with different developmental stages: "*The aim of preschool education is to promote the multifaceted, harmonious development of preschool children, the development of the child's personality, the reduction of disadvantages, taking into account age and individual characteristics and different developmental stages (including the care of children requiring special attention)"* (Gov. Decree 363/2012 (XII. 17.) on the National Core Programme of Preschool Education, Hungarian Gazette, 2012/171).

It also stipulates that – if the preschool educates a child with special educational needs – when preparing the pedagogical programme of the preschool, in addition to the Core Programme, the Guidelines for the Preschool Education of Children with Special Educational Needs (EMMI Decree 32/2012 (X. 8.) on the Guidelines for the Preschool Education of Children with Special Educational Needs, and the Guidelines for the School Education of Students with Special Educational Needs, 2012) must also be taken into account. As for further differences, equal opportunity measures and special development activities to reduce disadvantages resulting from special educational needs are compulsory elements of local preschool programmes in Hungary, unlike Slovakia.

The role of play

In Hungarian preschools, the play has a prominent role. The core programme stipulates that the predominance of free play in preschools should be emphasised. The priority given to play must be reflected in the preschool's daily schedule and in the organisation of playful activities. It stresses that the preschool teacher's conscious presence in the play process ensures that children's play unfolds in an experiential and immersive way. The preschool teacher achieves this through his/her supportive, stimulating and encouraging behaviour and indirect reactions, in addition to his/her activity in creating conditions. The Slovakian document contains only a few lines of a general description of the play.

Physical activity and a healthy lifestyle

The Slovakian curriculum defines these two areas as a unit within the cultural area of Health and Physical Activity. It describes its requirements and curricular content as is the case of the other areas. The Hungarian programme defines the development of a healthy lifestyle as a priority task of preschool education, the content of which is multifaceted in accordance with a holistic understanding of health. Physical exercise is included in this but also as a separate activity because of its importance for children's development.

Ethnic aspects

There is a significant difference in the language of preschool education. The Slovakian programme stipulates that the language of education in the Republic's preschool network is the official language of the state and that it is also compulsory for mother tongue education. The Hungarian Core Programme concerning the preschool education of children belonging to national minorities states that "the preservation, cultivation, strengthening, transmission, language education and the possibility of integration based on multicultural education must be ensured" (Government Decree No. 363/2012 (XII. 17.) on the National Core Programme for Preschool Education). In Hungary, the national minority preschools lay down in their local pedagogical programmes the tasks related to the cultivation of the language of the nationality. There are no other provisions concerning the language of preschool education.

Methodological freedom

Of the two programmes, the Hungarian document gives preschool teachers greater methodological freedom. Developmental psychology, didactic-methodological knowledge, regular renewal, and lifelong learning are the main building blocks of methodological freedom. Therefore, the role of modern training is also crucial in terms of methodological freedom. An analysis of courses shows that many of them organised for preschool teachers in Hungary are professionally high-quality methodological courses. In Slovakia, most training courses focus on acquiring theoretical knowledge or presenting legislation, mostly in the form of innovation and updating training (Pataki Tóth, 2021).

Examining the training courses accredited by the Ministry of Education, Science, Research and Sport of the Slovakian Republic for the period 2010-2018 for regional education staff, we can see that very few of them provide opportunities to expand the methodological repertoire (Ministerstvo školstva, vedy, výskumu a športu SR, 2020), and most of them are in the Slovakian language. This is why in Slovakia, NGOs often invite Hungarian-speaking preschool teachers to training courses organised for their Hungarian-speaking colleagues, who highly appreciate these methodological events.

In the questionnaire survey, 92% of the Hungarian-speaking teachers in Slovakia who took part in the research emphasised that during the training in their mother tongue, they had gained a lot of useful methodological knowledge that is also important for the cultivation of the mother tongue (e.g., learning methods of developing the mother tongue, working with literary works, possibilities of adapting fairy tales, opportunities of developing children with special educational needs, etc.). In their view, this was mainly because NGOs often asked Hungarian professionals to conduct the training, who focused more on methodology (Borbélyová & Orsovics, 2021). Therefore, it is worthwhile to examine and compare the training content and its impact on the development of teacher/professional competences in the two countries in the future.

The relationship between National (Core) Programmes and Institutional/Local Programmes

The basic programmes of both countries stipulate that preschool education can only be carried out based on an approved institutional programme that is

coherent with the core programme and can only be organised in the framework of activities that encompass the whole life of the preschool, with the full presence and involvement of the preschool teacher. However, the Slovakian document is more rigid. The Hungarian version is less restrictive, giving teachers greater space and freedom to plan local programmes, assuming they have a thorough knowledge of methodology, know the children, monitor their development, and make informed pedagogical decisions. The way in which this knowledge is acquired, and more broadly, how professional preparation takes place in the two countries – whether there are qualitative differences and whether this can have an impact on teachers' professional performance (and thus on children's development) – is a question that should be addressed in the context of teachers' professional (secondary and tertiary) training.

CONCLUSION

The way a country thinks about pre-primary education and how it is put into practice is largely determined by the compulsory documents that regulate the content of education. We believe that the 'know-how' of education has an impact on children's development. With this in mind, we thought to begin our explanation of the differences in the development of Hungarian pre-schoolers in Hungary and Hungarian preschool children in Slovakia by analysing the basic programmes of the two countries in order to highlight the similarities and differences in the central regulatory documents.

Our analysis reflects the differences in the development of preschools in the two countries, and the regulatory documents faithfully reflect this. The educational orientation of the programmes, rooted in their history of development, is clearly visible. A comparative analysis of the existing content regulations for preschools in Slovakia and Hungary reveals far more differences than similarities. For instance, the two documents reveal a significant difference in terms of approach, which may also have implications for the practice of educating and developing preschool children. We also see fundamental differences in thinking about children's activities (especially play), skill and ability development, and the transmission of literacy content, which need further exploration.

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A Comparative Analysis of Hungarian and Slovakian Primary School Curricula

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ABSTRACT

This study analyses the school curriculum documents in Hungary and Slovakia. The comparative analysis covered the Slovakian National programme for Development of Education, and the Hungarian National Core Curriculum and the framework curricula. Development tasks and content requirements for grades 1-2 were analysed. The research question focused on whether there is a difference in the manifestation of DIFER (Diagnostic System for Assessing Development) skills in the national curricula of the two countries. Earlier studies show that these DIFER skills are very important for school learning. The analysis of the curricula was carried out on the basis of general criteria and also a special set of criteria which related to the DIFER skills. It was found that these two countries have both state and local curricula, however, there are substantial differences in the documents. The most striking difference was found in the content of the educational requirements of the school subjects. In the Slovakian curriculum, educational standards define school subject objectives as well as performance and content requirements. In addition to school subject goals, Hungary also determines the development of specific competences within the given school subject. Special aspects related to DIFER skills were found in the Hungarian documents, in the overall goals and development requirements. In the Slovakain curriculum, the development of DIFER skills is embedded in the content of the school subjects, in the form of requirements. Although the improvement of DIFER skills is of prime importance, neither country's curricula devote sufficient emphasis to it.

Keywords: Hungary, Slovakia, curriculum, DIFER, content analysis

INTRODUCTION

The European Union makes recommendations for the education policies of its member states, but each country can determine its own education policy decisions on the basis of EU directives (Faragó, 2013). The Lisbon Decision of the Council of Europe of March 2000 sets out four key elements in this regard: (1) common objectives and guidelines; (2) the identification of quantitative and qualitative indicators and milestones to measure how the common objectives are reflected in national programmes; (3) the establishment of a set of indicators and milestones to measure the extent to which the common objectives are reflected in national programmes.) the development of national strategies (national action plans) based on the above - i.e. the transposition of European directives into national documents in the form of specific objectives and measures that take into account national and regional differences; (4) the evaluation of the above by the community on the basis of the indicators (Halász, 2003). Accordingly, in addition to the similarities in the conceptual and content regulatory documents of the Member States, local specificities are also apparent. Education and training in each EU country therefore has a unique and specific profile. In addition to many similarities, there are significant differences in the structure of education systems, educational objectives and principles, which are reflected not only in the documents but also in the output measures.

Podráczky et al. (2022) conducted a comparative analysis of Hungarian and Slovakian kindergarten education programmes. Their analysis shows that the differences in the developmental history of kindergartens in the two countries are reflected in the regulatory documents. In both places, the focus on education and upbringing can be traced, but the two documents show many more differences than similarities. There is a significant difference in approach to the activities of pre-school children, particularly in the case of play, and in thinking about the development of skills and abilities and the transmission of literacy content (Podráczky et al., 2022).

In addition to the comparative analysis of kindergarten programmes, we also considered it important to look at the lower primary school curricula, as significant differences in DIFER skills are present in grades 1 and 2. In order to explain this phenomenon, we have therefore analysed the content regulation documents for lower secondary education in the two countries by means of a

comparative analysis, with the aim of highlighting the similarities and differences between the public education programmes of the two countries.

Curriculum

The term curriculum was first used in the 16th century in Latin pedagogical literature, meaning the selection and arrangement of curricula, which can be interpreted as a process plan, activity plan or a programme. There are content-based curricula, which focus on the layout of the curriculum: what the school should teach and how. The competence-based curricula focus on the skills to be developed, the organizing principle is the applicability of knowledge. Five basic types of curricula can be distinguished: core curriculum, framework curriculum, local curriculum, cross curriculum, and a plan for extra-curricular activities - extra curriculum (Perjés & Vass, 2009).

In both Slovakia and Hungary, there is a two-pole content regulation (Chrappán, 2022). Two-pole content regulation means two levels of curriculum regulation in terms of the documents that define education, where the content of education is basically defined at two levels. The first is state-level regulation in the form of a basic curriculum, and the second is institutional-level regulation in the form of local curricula that directly regulate education and training. We can therefore distinguish between central and local curricula/curriculum in terms of educational management. A central curriculum is a binding document, the use of which is ordered by a public authority or the state. In this sense, a central curriculum can be national, but also regional or maintenance curricula (provincial, denominational, institutional, etc.). The local curriculum is the document chosen, agreed or developed by the institution and approved by the statutory authorities, e.g. the maintainers, the accreditation authority(ies) (Bárdossy, 2006). In Hungary, the National Core Curriculum and, in Slovakia the Innovative State Education Programme are the state-level regulations for primary schools.

National Curriculum (NAT) in Hungary

The first version of the NAT was published in 1995, after six years of discussion, and according to experts it followed the Anglo-Saxon type of content regulation, the National Core Curriculum, which was a two-pole regulation and decentralised in its structure, giving teachers the freedom to plan

and decide (Nahalka, 2020). The National Core Curriculum is one of the compulsory regulatory documents of Hungarian education, which defines the goals and content of education. The core curriculum sets the common literacy objectives and also includes the key competences and development tasks (Perjés & Vass, 2009).

The NAT was published as a government decree in the Government Gazette of the Republic of Hungary. The document currently in effect is Decree No 110/2012 (4.VI.) of 2012. The changes to the NAT in 2012 retained the basic structural elements, but there was a change in the regulation. The normative regulatory paradigm resulted in an emphasis on moral values in literacy education and the strengthening of national and social bonds. (Hoffmann, 2012). Definite content regulation was implemented, with intervention at the level of institutional educational processes. The use of the framework curriculum became compulsory again, the textbook market became more limited, and the complex system of school inspections was established. Some parts of the NAT were modified in 2018 and again in 2020. Its requirements set out the essential values found in the Constitution, the Public Education Act, international conventions on human rights, freedom of conscience and religion, children's rights, and national and ethnic minorities.

The framework curriculum is the highest-level content regulator linked to the NAT and is an intermediate regulator between local curricula and the framework curricula. The framework curricula for each type of school define the content to be taught in two-year cycles, the basic hours per subject area per two-year period and the compulsory basic weekly hours and maximum hours per year. The institution is free to manage 10% of the subject timetable. Although the National Curriculum is the highest-level document for regulating the content of education, it has no direct impact on the teaching-learning process in the classroom. The NAT works through a hierarchy of planning: the highest level is the framework curriculum, the set of programmes, from which the local curriculum is drawn up and the teachers write the annual subject programme and the curriculum. The theoretical and conceptual underpinning of public education is its main task, and it is formulated by means of legislation the main national objectives, the areas of education, the main stages and the related development tasks (Szabó, 2007).

Innovative Public Education Programme in Slovakia (IÁOP)

According to the Law on Public Education No. 245/2008 (Zákon č. 245/2008 Z.z. o výchove a vzdelávaní), the state curriculum is the highest hierarchical curriculum document in Slovakia for each level of education, developed in accordance with the international standard for the regulation of education and training. It defines the objectives and standards for pre-primary education, as well as the objectives, framework curricula and educational standards for primary, secondary and higher vocational education, in order to provide the basis for the acquisition of key competences for lifelong learning as defined by the European Commission. National curricula can be broken down into learning cycles (Ministerstvo školstva, vedy, výskumu a športu, 2018).

In Slovakia, national curricula are published by the Ministry of Education, Science, Research and Sport of the Slovakian Republic. Act No 415/2021 amending the Public Education Act No 245/2008 on education and training brought about a fundamental change in the Slovakian school system. It defined the concepts of national education, national school, national class, national school institution. It changed the structure of school education programmes: the title of the educational programme, the specific objectives of education and training. It introduced the concept of the educational cycle, which is reflected in the text of framework curricula, educational standards, curricula and syllabuses (Zákon č. 415/2021 z 20. októbra 2021, ktorým sa mení a dopĺňa zákon č. 245/2008 Z. z. o výchove a vzdelávaní (školský zákon) a o zmene a doplnení niektorých zákonov v znení neskorších predpisov a ktorým sa menia a dopĺňajú niektoré zákony).

Annex 11 to this Act ensures the alignment of the Innovative State Education Programme for Lower Primary Schools, published with effect from 1 September 2022, with the Public Education Act and the Regulation on Primary Schools for schools of national minorities. The Innovative State Education Programme for primary education was supplemented with the specificities of education and training in national minority schools. For minority schools, the programme is characterised by the compulsory teaching of the language and literature of the national minority and Slovakain language and literature. The pedagogical documentation of the school must be bilingual: it must be prepared in the state language and in the language of the national minority concerned (Ministerstvo školstva, vedy, výskumu a športu, 2021).

The structure of the programme is somewhat chaotic, while its length is very long. The IAP introduces the concepts of educational (cultural) standards and framework curricula. Educational standards are defined as requirements that prescribe what children should have mastered and know by the end of a given year. It defines the requirements as specific competences, which include knowledge, aptitude, skills, attitudes and values (Štátny vzdelávací program. Primárne vzdelávanie - 1. stupeň základnej školy, 2015). One of the 3 main components of the programme is the framework curriculum, which is an annex to the IÁOP for Hungarian nationality schools from 2016.

DIFER

The DIFER (Diagnostic Systems for Assessing Development) programme package for 4–8-year-olds has been available for Hungarian kindergartens and schools since 2004 (Nagy et al., 2004a). The aim of the programme package was to provide teachers with a tool to support the development of skills in kindergarten and school and to help them start school. DIFER is a test system for 4–8-year-olds, consisting of seven tests, which were standardised in 2002 on a sample of about 23,000 children. In this way, the process of skill acquisition between the ages of 4-8 years is known (Nagy et al., 2004b). In Hungary, the DIFER Programme Package is the only standardised test system for teachers to assess the cognitive and social skills of pre-school and primary school children. It is used regularly by more than half of kindergartens in Hungary and is compulsory in the first grade of schools (Józsa, 2022).

The DIFER supports the diagnostic measurement and development of seven basic elementary skills (Józsa, 2016), all of which are considered critical prerequisites for personal development and school learning. The critical elementary skill of literacy acquisition is the coordination of writing movements. Listening to spoken language is essential for beginning to learn to read and write. The development of relational vocabulary is a crucial factor for the reception of linguistically communicated information, the development of elementary numeracy is a crucial factor for learning mathematics, and the development of empirical reasoning and empirical contextual understanding are critical prerequisites for acquiring knowledge, learning and thinking. A further crucial criterion for successful integration and learning at school is the

development of social relationships (with peers and adults), so-called sociality (elementary social motives and skills).

The composite index of the seven DIFER tests is called the DIFER index. The DIFER Index is a single measure of a child's development of the basic elementary skills system, which is also a reliable indicator of school readiness. There is a strong correlation between the DIFER index and intelligence development (Józsa et al., 2022).

A five-level developmental model is used to characterise the process of skills acquisition, from the preparatory, initial, advanced and then final levels to the optimal level. When characterising a child's development, we specify the stage of skill acquisition at which the child is at (Nagy et al., 2004b).

The benchmark for development is the optimal level of skill functioning. Skill development is recommended to continue until the child reaches the optimal level of development. If optimal skill acquisition has not been achieved in preschool, development can continue at school, even in higher grades (Nagy, 2003, 2008).

Successful completion of a test indicates optimal mastery of the skill. This is indicated by a score close to 100% on the test, with thresholds of optimal mastery defined for each skill. It can also be said that the measurement gives the development of children in relation to the optimal development of the skill as a criterion.

The development of the skills measured in the DIFER Toolkit is supported by a series of books that can be used by teachers in kindergarten and school. The books contain methods, games and practical ideas for developing skills. They are methods that have been proven effective in development trials. The methodology for developing listening skills (phoneme perception) is covered in the book by Margit Fazekasné Fenyvesi (2006), which is complemented by a collection of calling pictures and vocabulary cards. For developing social skills, Anikó Zsolnai (2006) has compiled a collection of games. For the development of fine motor skills, the games of Katalin Miskolcziné Radics and József Nagy (2006) can be used effectively. József Nagy (2009) edited a publication on the development of the mother tongue and thinking. This book deals with the methodology of developing relational vocabulary, empirical inference and empirical context management. It includes a collection of 50 stories and group discussions based on them. This collection of stories is the

work of Ágnes Nyitrai (Nyitrai, 2016; Nyitrai & Darvai, 2013). A collection of methods and games for developing numeracy (pre-mathematics) skills gives the level of complexity of the games to be developed according to the five acquisition levels (Józsa, 2014). A collection of games for developing two thinking skills, systematizing and combinative (combinatorial), was published last (Józsa et al., 2017).

Research Methodology

In our study, we present a comparative analysis of Hungarian and Slovakian school content regulation documents. We compare the new Slovakian Innovative State Education Programme (IÁOP) and the Hungarian National Core Curriculum (NAT) in primary grades 1-4, and the two countries' framework curricula in grades 1-2. The aim of our research is to explore the similarities and differences in the school regulatory documents. For the aforementioned documents, we conducted a content analysis of the text (Hendl, 2016; Skutil, 2011). Our research question was to find out whether there are differences in the national curricula of the two countries in terms of the presentation and development of DIFER skills. We were interested in how the development of competences based on DIFER skills is reflected in the curricula.

A comparative analysis of the content regulation documents was carried out on the basis of a set of criteria focused on general curricula and a specific set of criteria based on DIFER skills.

Comparison of the Regulatory Documents of the Two Countries in General Terms

The analysis was based on the following aspects: the name, scope, structure, content, presentation of key competences, provision for children with special educational needs, nationality aspects, methodological freedom, and the role of the state programme in the development of institutional programmes. In the case of the National Core Curriculum, the use of the word 'plan' in the title suggests greater freedom, whereas in the Slovakian Innovative State Education Programme, the educational activities of teachers are more bound.

The Hungarian NAT is 208 pages in total (Government Decree 110/2012), supplemented by Decree 100/2012.The Slovakian IAPP is 285 pages in total,

but since there are subjects taught only from grade 3 onwards, the total number of pages for grades 1 and 2 is 148 pages less.

Both the Hungarian and Slovakian education systems are two-set, which means that in addition to the core programme, there is also a local programme. In Slovakia, the criterion-oriented education system is more pronounced, meaning that it aims at the fulfilment of a set of requirements prescribed by the state curriculum. The main framework of the Slovakian state curriculum is the unity of the set of requirements, the content of the curriculum and the assessment questions (Podráczky et al., 2022).

Both documents consist of three main parts. In the case of the NAT, Part 1 is "Content regulation and levels of regulation of school education", which includes development areas, educational objectives, and the methodological principles of unity and differentiation. Part 2 is 'Competence development, literacy transmission, knowledge building', which describes the key competences and the areas of literacy. Part 3 is "Material in the areas of literacy" for grades 1-4, 5-8, 9-12 (Government Decree 110/2012). Unit 1 of the Slovakian IÁOP is the "General Part", which contains the general objectives of education and training, names and describes the eight areas of education and the conditions for the development of educational (pedagogical) programmes at schools. It also deals with the provision of educational conditions for children with special educational needs. In the second unit, the educational standards are presented: separately, as subjects. In addition to the description of the subjects and their objectives, the performance standards of the subjects are defined as output targets in the form of expected minimum development requirements per grade. In parallel, the curriculum content is briefly described in the form of key words. Finally, the third part is the framework curriculum for national schools, published in 2016 and also annexed to the IAP. It defines the number of hours for each subject. The table below (Table 1) illustrates that the NAT contains 10 areas of learning and the IAPC defines 8 areas of learning.

Table 1. NAT fields of education and IAPC fields of education

NAT fields of education		IÁOP education areas	
1.	Hungarian language and literature	1.	Language and communication
2.	Mathematics	2.	Mathematics and information management
3.	Man and nature	3.	Man and nature
4.	Man and society	4.	Man and society
5.	Our Earth - our environment	5.	People and values
6.	Lifestyle and practice	6.	People and the world of work
7.	Arts	7.	Arts and culture
8.	Physical education and sport	8.	Health and physical exercise
9.	Foreign languages		
10.	Informatics		

The main similarity between the two documents is the threefold structure and the presence in each of them of fields of competence/areas of learning and key competences (Table 2).

The Slovakian state education programme defines the requirements as specific competences, which include knowledge, aptitude, skills, attitudes and values. As an output, it defines the key competences that learners should have. While the key competences are more detailed in the Slovakian curriculum, the Hungarian NAT presents them in the same formulation as defined by the European Commission in 2019 (European Commission, 2019). However, the content of the defined key competences is the same in both countries, which means that primary education and training in both countries follows the philosophy of European education policy, i.e. it focuses on the development of key competences for lifelong learning as defined by the European Commission.

Table 2. NAT and IAP key competences

NAT key competences	IÁOP key competences
• Communication in your mother tongue • Foreign language communication • Mathematical competence • Scientific and technical competence • Digital competence • Social and civic competence • Initiative and entrepreneurship • Aesthetic-artistic awareness and expression • Effective, independent learning	• Know and use effective learning methods, • Express yourself coherently in your mother tongue and in the official language, both orally and in writing, • Understand basic English vocabulary and be able to use it in different situations, • Use basic mathematical thinking to solve problems in everyday life, • In the course of your learning, use selected information and communication technologies and be aware of the risks and dangers associated with the use of media and the internet, • Learn the basics of critical thinking when working with information, • Apply the knowledge you have acquired in science and social studies to carry out certain activities and to care for yourselves and others. • Recognize and reflect on the causes of problems at school and in your immediate environment, and propose solutions according to your current knowledge and experience. • Respect yourself and others. Communicate and cooperate in a friendly manner. • Behave in a civilized way in different situations and circumstances. • Be attached to the cultural - historical heritage, traditions and arts that you encounter in your life. • Be tolerant, understand others. Know and accept cultures, traditions and ways of life that are foreign to you. • Be aware of your rights and obligations and respect the rights of others

However, there is a significant difference between the two documents in terms of content. The composition and naming of the learning areas are similar.

The NAT integrates the life skills education domain into the educational content of the first stage of primary school. From the perspective of lifelong learning, this area is mainly about the development of the so-called soft skills that learners will need in later work (Majid et al., 2012). The Hungarian document emphasises that primary school education should be based on the application of knowledge and skills in different learning situations, in relation to real life. There are also differences in the subject areas and their placement in the grades. Foreign language, English, is taught from grade 3 in Slovakia, while in Hungary English or German is only introduced in grade 4.

The most striking difference is the way the content of the teaching requirements for the subjects is handled. In Slovakian education, the educational standards only define the characteristics, the subject objectives and the performance and content requirements, whereas the Hungarian educational level defines not only the subject objectives but also the developmen of specific competences within the subject. The programme prescribes the specific subject areas, together with their timing, the subject learning outcomes in terms of the achievements to be known and attained by the learner at the end of grades 1 to 2, and the development activities and knowledge. It defines specific concepts and recommended activities and tasks. Compared to the Slovakian educational document, the Hungarian one elaborates in more detail the content of each subject, which guides and regulates the teacher's teaching activities. The third parts of the above curriculum documents also differ from each other. In the Slovakian curriculum, it consists of a framework curriculum that defines the weekly timetable for teaching subjects in each grade. The Hungarian NAT does not present the timetable for teaching the subjects as a separate section. The third part of the Hungarian NAT is the glossary of terminology mentioned above.

Comparison of the Two Countries' Regulatory Documents in Terms of the Emergence of DIFER Skills

For the analysis, we first translated the DIFER skills into analytical criteria. We identified the ways of representation in curricula and regulatory documents. This was necessary because the naming of the DIFER skills carries a specific content, which needed to be matched with content that could be analysed in

curricula to infer the potential for developing the skill. The resulting mapping sequence per skill is summarised in Table 3.

Table 3. Criteria for the curricular representation of DIFER skills

DIFER skills	Analytical criteria for DIFER skills
Fine motor skills	Preparation for learning to write.
Phoneme perception	Speech development, reading preparation, teaching reading.
Relational reasoning	Vocabulary, vocabulary development, relations, comparison, relational vocabulary.
Pre-maths skills	Basic mathematical skills, number sense, numeracy, number concepts, basic operations.
Deductive reasoning	Linguistic logic, logical operation, inference.
Empirical context-understanding	Linguistic logic, context, oral and written comprehension.
Social skills	Basic moral sense, relationship with peers, relationship with teacher, commitment to task, task attitude, attitude to task, perseverance, emotional attitude, concentration.
Conceptual thinking-systematization of knowledge	Mathematical reasoning, forming sets, classifying into sets, comparing sets, recognising properties of elements in sets, sorting, ordering.
Combinative or combinatorial thinking	Mathematical thinking, combinatorics, combinations, combining, variation, permutation.

As regards the general aspects, we have already noted that there are substantial differences in the content of the curricula of the two countries. We have tried to adapt the specific aspects of the analysis accordingly. In the present analysis, we first focus on the general objectives of the two highest level regulatory documents, the Hungarian National Core Curriculum and the Slovakian Innovated State Education Programme, and then we include the Hungarian Framework Curricula in our analysis.

The development areas of the NAT include educational objectives that represent the core values in the pedagogical process in a comprehensive way, are integrated into the content of subjects, can be presented as a separate subject and play an important role in determining the purpose of extra-curricular development (NAT, 2012). As an overarching educational objective, moral education is in itself directly linked to one of the dimensions of the DIFER

social skills framework, basic moral sense. The NAT identifies the development of children's moral sense as a fundamental goal of public education, and mentions the development of compassion and helpfulness as essential skills, which are also included in the DIFER subtest measuring the development of moral sense as the subject of a story examining moral sense (Nagy et al., 2004b). Among the goals of moral education, we find the education for independent thinking as a comprehensive goal, in which the development of both linguistic and mathematical thinking skills is reflected. The DIFER skills include two linguistic reasoning skills: empirical inference and empirical contextual understanding, and two mathematical reasoning skills: elementary systematic and elementary combinatorial skills. Each of these skills is based on the development of independent thinking.

The development of independent thinking, creative and critical thinking, analytical skills and the culture of debate also rely heavily on the linguistic reasoning skills defined as basic skills in DIFER (NAT, 2012). The above-mentioned linguistic skills are directly related to deductive reasoning schemes, the conscious use of which contributes to the development of analytical, proof and refutation skills (Nagy et al., 2004b). Within the development of self-knowledge and social culture, the NAT sets the development of comprehensive skills, abilities and competences, and the development of knowledge areas as its goal. In addition, through the development of self-awareness, the development of human relations, respect and understanding of other people is specifically highlighted (NAT, 2012). This priority is found in the social skills framework of DIFER, and the relationship with peers and the teacher is assessed in several cases during the test-taking. Specific observation criteria are included for these areas. During small group activities (taking the writing coordination test in groups of 4), and children are observed to what extent they can respect each other's work and to what extent they disturb each other. The relationship with the teacher is assessed before each individual assessment on the basis of how proactive, indifferent or reluctant the child is after the encounter with the adult (Nagy et al., 2004b).

Within the educational objectives, there are also aspects on DIFER skills in the career guidance objectives. Today, when choosing a career, it is very important that students learn to work in teams, develop their ability to cooperate, learn behaviours that can help them in competition and leadership,

and increase their willingness to compromise (NAT, 2012). Among the cooperative skills and skills that underpin effective task performance mentioned here, the DIFER sociality test includes several observational aspects. The assessment of task engagement, perseverance, emotional attitude towards the task, concentration, together contribute to the achievement of the educational goals formulated in the career guidance (Nagy et al., 2004b).

As we have already pointed out, the structure and content of the Slovakian IAP differs significantly from the Hungarian NAT. If we take the specific aspects of DIFER competences as a starting point, they do not appear in the form of overarching objectives, but are embedded in specific subject content, within which they are embedded in the form of requirements.

For example, the IARP sets specific development targets for literacy lessons, such as "being able to write letters and Arabic numerals correctly (uppercase and lowercase letters, as well as numbers) in a patterned way" as an output requirement by the end of Grade 1 (Inovovaný Štátny vzdelávací program, 2016). This specific developmental goal can obviously only be achieved if the skill of writing motor coordination (fine motor skill) is functioning, since learning to write letter elements, letters and numbers can only be ensured under appropriate fine motor conditions. In reading, the exit requirements at the end of grade 1 include:

- Distinguishes between sound and letter,
- Can distinguish and pronounce short and long vowels and consonants,
- Can connect sounds into syllables and then into words, can divide words into syllables, which can then be broken down into sounds. Reading by the end of grade 2
- Can differentiate between vowels and consonants,
- Can distinguish between short and long vowels and consonants,
- Raises awareness of the altered meaning of the word in the case of long and short vowel and consonant substitutions (Inovovaný Štátny vzdelávací program, 2016).

The end of Year 1 and Year 2 outcome requirements are specific learning objectives, which clearly reflect the ability to listen to spoken language. These outcome requirements could not be achieved without the use of speech-language hearing (phoneme perception).

The development requirements include the development of DIFER skills in all subjects, but with a particular focus on pre-mathematics, Hungarian language and literature and ethics. For example, the specific requirements for the content of relational vocabulary are concretised in the mathematics subject in the first year of school on the number range of 20 and in the second year on the number range of 100. Relational reasoning in which concepts relating to the orientation within the number sequence are also used: before, after, immediately before, immediately after, penultimate, last, next, previous, ascending number sequence (from the smallest number to the largest number), descending number sequence (from the largest number to the smallest number). In the first year in geometry, the content standards focus on the acquisition of the terms right, left, up, down, up, down, under, in, in, forward, back, side, middle, front, back and also comparative terms: longer, shorter, taller, shorter, wider, narrower, longest, shortest.

Expectations for sociality at the end of Year 1 are set by the performance standards of the subject Ethics Education (an optional subject in parallel with Religious Education). For example, by the end of the first year, the pupil is able to participate in the establishment of group rules; he/she is able to give examples of respect for parents, teachers and classmates; he/she is able to express gratitude, requests and apologies appropriately; he/she is able to follow group rules; he/she is able to respect classmates and he/she is able to demonstrate the importance of self-control in interpersonal relationships.

The above examples have been used to highlight that there are significant differences between the two countries' highest level curricular documents and that the development of DIFER skills is embedded in these documents in very different ways.

CONCLUSION

The decisive role of the initial phase of schooling has been the subject of a series of studies. This period is of particular importance for children's personality development, later school performance, motivation and success (Józsa et al., 2022). In Hungary, most kindergartens and schools use the DIFER package of tests before starting school and during the first year of school to get an objective picture of children's cognitive and social skills. DIFER tests provide accurate

information on the basic skills that are essential for progress at school. We are not aware of any previous research that has comprehensively reviewed school regulatory documents to determine whether DIFER skills are reflected directly or indirectly in content regulators. In our analysis, we therefore attempted to do so, linking it to our previous research comparing the development of basic skills of Hungarian and Slovakian children in Slovakia. In our study we analysed the representation of DIFER skills in Hungarian and Hungarian content regulation documents in Slovakia.

We compared the new Slovakian Innovative State Education Programme (IÁOP) and the Hungarian National Core Curriculum (NAT) for primary school grades 1–4 and the framework curricula for grades 1–2. A comparative analysis of the content regulation documents was carried out on the basis of a set of criteria for general curricula and a specific set of criteria based on DIFER skills. Our aim was to explore the similarities and differences in the school regulatory documents.

Based on our analysis, we found that the curricula of the two countries differ in content and structure. We found similarities in the presentation of some key competences, although the key competences are found in different structural elements of the regulators. Aspects related to the development of DIFER skills appear at several levels in the Hungarian regulators, while the Slovakian documents mainly contain standards adapted to the level of knowledge. In the Hungarian curricula, DIFER skills are typically found in the overall objectives and development requirements, while in the Slovakian curricula they are explicitly embedded in the content of the subjects, in the form of requirements.

Based on our content analysis, we found that there are far more differences than similarities between the two countries' curricula for grades 1–2. These differences may have an impact on children's skill development in the foundation stage of school, which may also affect children's cognitive and social skills development in later years of school.

In Hungarian kindergarten and school practice, teachers have been using the DIFER tests for almost 20 years. At the beginning of each school year, first-grade teachers are required to assess the basic skills of children for whom they consider it necessary on the basis of their experiences in kindergarten or first school. In a significant number of schools, all first-graders are assessed using

the DIFER Package. For Hungarian children in Slovakia, this test-taking protocol is not part of pedagogical practice.

The aforementioned differences in pedagogical diagnosis are not reflected in the comparison of curricula. In Hungary, DIFER has been present in pedagogical diagnostics for 20 years, yet the development of DIFER skills is not directly mentioned in the Hungarian curricula, the acronym "DIFER" itself and the name of the skills are not mentioned at all in the Hungarian content regulation documents. However, the results of our previous longitudinal research over eight years confirmed that the development of DIFER skills in kindergarten significantly predicts later text comprehension and mathematics achievement (Józsa et al., 2022). These results also provide evidence that DIFER skills could be given more emphasis as an area for development in any future curriculum modifications in both countries.

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RELIABILITY, VALIDITY AND MEASUREMENT INVARIANCE OF THE DIFER TESTS

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ABSTRACT

This study focuses on examining the psychometric properties of the DIFER test, a widely used assessment tool for measuring school readiness. DIFER, which stands for Diagnostic Systems for Assessing Development, has gained prominence in Hungary and some European countries as an effective means of evaluating children's readiness for school. By investigating the reliability and validity of the DIFER test, this study aims to enhance the understanding of the suitability of the DIFER test for cross-cultural and longitudinal studies in assessing school readiness. Conducted as a survey study, the research involved 3050 Hungarian students from Slovakia and Hungary. Employing Rasch analysis and multi-group confirmatory factor analysis (MG-CFA) aid in verifying the precision of the DIFER test as a valuable assessment instrument for determining school readiness. The results revealed a strong alignment between the difficulty level of the test and students' actual abilities, demonstrating its reliability and validity. Importantly, the analysis found measurement invariance across various factors, including country, gender, and age. This indicates the consistent performance of the DIFER test in assessing school readiness across diverse groups. However, mean differences in latent abilities were observed among different age groups, indicating that older students exhibited notably higher proficiency in pre-mathematical skills compared to their younger counterparts. The findings offer valuable insights to educators, providing a reliable tool for assessing school readiness and identifying areas for improvement.

Keywords: school readiness; DIFER; reliability; validity; measurement invariance; assessment

INTRODUCTION

The transition from the early stages of exploration and discovery to the structured expectations of formal education signifies a critical juncture in a child's educational journey. It is during this pivotal period that the concept of school readiness takes center stage, acting as a vital determinant of a child's future academic success (Macy et al., 2021). School readiness encompasses a comprehensive set of foundational abilities that encompass diverse domains of early learning, including cognitive skills, receptive and expressive language proficiency, executive functions, and social–emotional and behavioral competencies (Amukune et al., 2022a; Józsa et al., 2022a; Russo et al., 2019).

Evaluating school readiness assumes paramount significance, as it provides crucial insights into a child's preparedness for the educational journey that lies ahead. Children who enter school without the necessary skills and competencies required for school readiness often experience challenges in their developmental trajectory, potentially hindering their academic progress throughout their elementary school years (Russo et al., 2019). To this end, a variety of assessment approaches have been developed to gauge children's readiness for school, including the game-based assessment (GBA) by Amukune et al. (2022a); the Brief Early Skills and Support Index (BESSI) by Fink et al. (2019); and the Diagnostic Systems for Assessing Development (DIFER) introduced by Nagy et al. (2004a) and explored by Józsa et al. (2022b).

In the era of globalization, researchers have been afforded numerous opportunities to conduct cross-cultural studies (Anthony et al., 2022; De Los Reyes et al., 2022; Torregrosa Díez et al., 2022) and longitudinal investigations (Brock et al., 2018; Opozda-Suder et al., 2021; Samuels et al., 2016) across various educational domains. However, for such studies to yield meaningful and comparable results, it is imperative that the measurement instruments used possess measurement invariance (Diotaiuti et al., 2022). By establishing measurement invariance, researchers gain confidence in comparing and interpreting analytical outcomes, such as latent means, across distant groups and different timeframes (Gygi et al., 2016).

Although the concept of measurement invariance has garnered considerable attention in psychological research (Bravo et al., 2021; Calchei et al., 2023; Lau et al., 2022; Teo et al., 2022; Zewude & Hercz, 2022), there remains a significant research gap concerning the confirmation of psychometric

properties of school readiness assessment. Consequently, the present study endeavors to address this gap by examining the measurement invariance of the DIFER test, which assesses the school readiness of young children. Through an in-depth exploration of the psychometric properties of this assessment, we aim to contribute to the body of knowledge surrounding school readiness assessment in the context of educational studies.

Literature Review

Children's School Readiness and Assessment

Various approaches exist for defining or conceptualizing the essence of children's school readiness. For example, school readiness is defined as the capacity of children to regulate emotions for appropriate social responding, as well as the ability to regulate attention and utilize selective strategies during cognitive tasks, with self-regulatory skills forming the foundation for the behaviors and attributes associated with successful school adjustment (Blair, 2002; Curby et al., 2018; Denham, 2006; Duncan et al., 2007; Józsa et al., 2022a; Miller & Goldsmith, 2017). It also refers the acquisition of a range of skills typically anticipated upon starting school, enabling children to thrive in their social and academic growth (Bender et al., 2011; Macy et al., 2021). This multifaceted and comprehensive notion encompasses various aspects, such as physical, social, emotional, and cognitive skills and competencies. Mukkiri et al. (2022) clearly defined it as basic skills that children need to possess at school entry in order to adapt successfully to the school environment and to learn and achieve at a satisfying level. Regarding the school readiness assessment, the DIFER (Diagnostic Systems for Assessing Development) school readiness test is quite popular in Hungary and some countries in Europe (Józsa et al., 2022a). The DIFER test aims to assess the progress of fundamental abilities in children aged 4–8 and to delineate the benchmarks for enhancing their acquisition (Nagy et al., 2004a):

- Fine-tuned co-ordination between writing and motion, a prerequisite for writing instruction (fine motor skills);
- Effective speech perception and auditory skills, a fundamental requirement for successful reading instruction (phoneme perception skills);

- Foundational vocabulary knowledge, essential for proficient verbal communication (reading comprehension);
- Fundamental arithmetic capabilities (pre-mathematics skills);
- Deduction based on experiential learning (deductive reasoning skills);
- Comprehension of relationships based on experimental learning, both pivotal for cognitive advancement (relational reasoning skills);
- Cultivation of social aptitudes, pivotal for school life and personality development (social skills).

Fine motor skills refer to the abilities to adeptly hold, grip, and control diverse objects. The progression of fine motor skills involves the synchronization of small muscles, particularly those within the hands and fingers (Fischer et al., 2022). Phoneme perception is quite important for the reading acquisition of preschool and young elementary school children. Their phoneme perception depends on their awareness of the segmental nature of spoken language and the ability to manipulate its constituent parts (Conant et al., 2014). Teaching school-age children the skill of reading comprehension is pivotal, as it acts as a method of transferring knowledge that gains greater significance as they progress through their academic years and into the future. Reading comprehension is an interactive process consisting of two main aspects: the ability to directly understand the text and the ability to draw conclusions (including two types of conclusions—cohesive conclusions and information-based conclusions) (Spätgens & Schoonen, 2019). The pre-mathematics skills in DIFER are a combination of five different sub-skills of children such as counting-up, counting-down, manipulative counting, object counting, and number reading (Nagy et al., 2004a). Reasoning skills are quite important for young children's academic education and future lives. Their deductive reasoning involves using known principles to establish the placement of a new object or entity within a sequence; it involves drawing a conclusion based on facts that are already known as true. And for relational reasoning, this refers to employing known relationships to deduce connections between new entities; it involves utilizing an understanding of equivalent patterns or relational comparisons to make sense of a novel pattern (Guerin et al., 2021). Finally, with regard to social skills, this encompasses the capacity to form successful and favorable interactions with peers, which are linked to a smoother transition into formal school environments and sustained academic success

throughout their educational journal (Valiente et al., 2021; Ziv, 2013). Hence, it is evident that the readiness of children for school plays a crucial role in their academic/school achievement, highlighting the necessity to prioritize the evaluation of school readiness to ensure accurate assessment.

Various educators worldwide employ diverse assessment methods for assessing children's school readiness based on different knowledge and competence domains. Macy et al. (2021) utilized two recently developed measures known as AEPS-3 Ready-Set and Ready-Set Family Assessment of Children's Skills (FACS). Ready-Set is a tool designed to evaluate children's readiness for kindergarten, collecting information from teachers or professionals regarding their skills in essential developmental areas such as adaptive, cognitive, fine motor, gross motor, social emotional, social communication, literacy, and math. FACS serves as a companion measure, enabling parents to assess and report their child's abilities across the same developmental areas covered by Ready-Set (Macy et al., 2021). The findings indicated that teachers perceived Ready-Set as a user-friendly resource that supplied pertinent information about children's readiness skills. In another study, the Jamaica school readiness assessment (JSRA) test was employed (The Jamaica Education Transformation Commission 2021). JSRA comprises three components: the Eleven-Question Screen (EQS), which is an adapted version of a ten-question screening; the child behavior rating scale; and the early learning scales. It assesses developmental aspects, behavior, early literacy skills, early numeracy skills, and approaches to learning. The results showed that additional measures need to be taken to enhance and address data gaps, ensuring the validity and reliability of the data. Another study (De Almeida Maia et al., 2020) employed the Bracken School Readiness Assessment (BSRA) to evaluate six fundamental concepts through a set of 88 questions divided into six domains: colors, letters, numbers/counting, sizes, comparisons, and shapes. Researchers found clear indications of multidimensionality, showing 10 items (out of 88 items) with low reliability. Additionally, Fink et al. (2019) conducted a study that investigated the connection between social success upon entering school and teachers' evaluations of school readiness using the Brief Early Skills and Support Index (BESSI), while also accounting for language ability. The result highlights the significance of cognitive and socioemotional abilities, as well as family support, in terms of a child's

preparedness for school and their social achievements during the transition to formal education. Chinese teachers' perceptions were also collected for their children's school readiness in one study (An et al., 2018). The study used the Chinese Teachers' Judgments of Children's Behavior Survey which has 32 questions in total. The survey questionnaire has five main parts such as questions about entering the first grade, questions about school information, questions about teacher information, questions about teacher preparation, and questions about classroom information. The results indicated that the students were not ready for school, experiencing challenges in both academic and social–emotional abilities. Moreover, in one study, the aim of the assessment was to compare the school readiness and motor abilities of typically developing first-grade students with those of disadvantaged children. Lepes et al. (2016) assessed children's skills such as writing–motion, speech–hearing, relational vocabulary, basic calculation, socializing, deduction, and comprehension of relationships. The study found the importance of socializing and motor skills of children in their school readiness even though there is a lack of results about the reliability and validity of the instruments.

While the majority of previous studies examining the assessment of school readiness have primarily focused on the cognitive aspect, and social and motor skills, recent investigations have revealed additional crucial factors that contribute to the transition from preschool to kindergarten. These factors include motivation, executive function, and emotion regulation (Amukune et al., 2022b; Berhenke et al., 2011; Blasco et al., 2023; Józsa et al., 2017; McWayne et al., 2012). Moreover, UNICEF has generally proposed a school readiness model that encompasses three key components: school-related information, child-related information, and family or community-related information (Nair et al., 2023). To sum up, various researchers have employed diverse domains when assessing the school readiness of different student groups, with cognitive aspects, social skills, and motor skills being commonly included. It is crucial to acknowledge that these instruments need to undergo psychometric evaluation to ensure their suitability for different participants and varying timeframes (Liu et al., 2020). Additionally, emphasis should be placed on incorporating assessment theories during the development of psychological scales (Polat et al., 2022).

Developmental Change by Age

Understanding the trajectory of developmental change across different age groups is crucial for comprehending the nuances of cognitive and socio-emotional development. As children progress through their early years, marked shifts in cognitive abilities, emotional regulation, and social interactions occur. These developmental changes are often attributed to the interplay of genetic predispositions, environmental influences, and maturation processes (Blair & Raver, 2015). Demetriou et al. (2020) emphasize the need to explore these age-related transformations, highlighting the significance of investigating how empirical factor structure evolve across different age groups. According to the age span of four years, there is a change in students' mental process and personality (Demetriou et al., 2023). Assessing school readiness across age groups demands understanding key cognitive factors, where general cognitive ability (g) plays a crucial role. The underlying 'g' factor showed a significant heritability of 86%, primarily contributing to genetic influences across distinct cognitive domains and fundamental cognitive assessment (Panizzon et al., 2014). Furthermore, Neumann et al. (2021) mention that cognitive abilities evolve swiftly in the initial stages of childhood due to the maturation of the brain and the influences of the surrounding environment. As a result, it is essential to take into account age-related aspects when evaluating their developmental progress. This endeavor becomes especially pertinent in the context of assessing school readiness, as the transition to formal education coincides with a pivotal phase in a child's development. By capturing and analyzing these developmental shifts, researchers can gain insights into the distinct cognitive, emotional, and behavioral features that characterize each group, thereby advancing our understanding of the intricate process of children's development.

Theoretical Perspectives to Assessments

There are some measurement theories which can supply primary methods used in the psychological scale development. Test theories are frameworks used in psychometrics to study the properties of psychological tests and measure various aspects of human behavior (Dean et al., 2021). Three popular test theories are the classical test theory (CTT), item response theory (IRT), and structural equation modeling (SEM).

CTT is the oldest measurement theory that assumes a person's test score is the sum of their true score (actual ability) and measurement error (Siregar & Panjaitan, 2022). It analyzes the reliability, validity, and sources of measurement error, with the true score representing the individual's actual ability and the measurement error reflecting the variability in observed scores unrelated to the true score (Haw et al., 2022). However, CTT does not account for item difficulty or variability in individual differences in ability levels (Ayanwale et al., 2022) and MI testing (Siregar & Panjaitan, 2022). IRT is a modern approach to psychometric measurement that models the relationship between a person's ability level and their responses to test items (Polat et al., 2022). IRT assumes that items have varying degrees of difficulty and discrimination, allowing the estimation of individuals' abilities based on their responses (Liu et al., 2022). IRT is useful for analyzing differential item functioning (DIF) and detecting item bias. This DIF analysis can also be applied as one type of measurement invariance (MI) testing in some studies (Åström et al., 2022; Visser et al., 2017; Zhong et al., 2023). SEM is a statistical technique used to model complex relationships between variables. SEM is widely used in various fields, including psychology, sociology, marketing, and economics, to test and refine theories, estimate parameters, and generate predictions. Many researchers employed SEM to investigate MI across different groups, such as gender or cultural groups, to ensure that a test is measuring the same construct in all groups (AL-Dossary, 2021; Anthony et al., 2022; Byrne, 2016).

DIFER test which is designed as a nationally used Hungarian school readiness test (Nagy et al., 2004a), perspectives of these three theories (CTT, IRT, and SEM) are considered to analyze the test's properties and examine measurement invariance across different groups. CTT suggests to focus on assessing the reliability and validity of the test scores and identify sources of measurement error. And IRT is beneficial for analyzing the relationship between individuals' abilities and their responses to test items, and identifying any items that may be biased against certain groups. Finally, SEM is appropriate for examining measurement invariance (MI) across different groups to ensure that the test is measuring the same construct in all groups.

Measurement Invariance (MI) and Its Assessing Methods

Measurement invariance testing can decide if the test-items can give the same challenges to test-takers of different groups or contexts (Chiu et al., 2015). MI also focuses on whether the construct of the instrument is psychometrically equal across different groups. Otherwise, measurement bias or variance shows that test-takers with the same ability or latent construct can obtain different scores depending on the group they are part of (Sočan & Kocjan, 2022). Therefore, it is wise to take care with regard to the value of MI testing in psychological research. The Multi-group Confirmatory Factor Analysis (MG-CFA) is an extension on the strength of confirmatory factor analysis (CFA), providing a more comprehensive test of MI by examining multiple aspects of the construct, such as configural, metric, scalar, and residual variances (Gygi et al., 2016; Zewude & Hercz, 2022).

Configural Invariance

Configural invariance refers to the property of a measurement model that shows that the same underlying factor structure is present across different groups or time points (Fischer & Karl, 2019). To test the configural invariance, we can conduct separate CFAs for each group or time points and compare the resulting models (Tsaousis & Alghamdi, 2022). The fit of each model is evaluated by using goodness-of-fit indices, such as the ratio of Chi-square by degrees of freedom, the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) (Li et al., 2019). If the factor structure is the same across groups or time points, the model should fit the data well, indicating configural invariance (Gygi et al., 2016; Kim et al., 2022).

Metric Invariance

Metric invariance refers to the degree to which the factor loadings are equivalent across groups or settings. If the instrument has metric invariance, the participants across groups ascribe the same meaning to the latent construct under study (Tsaousis & Alghamdi, 2022). When the metric is invariant, it means that the relationship between items and the latent construct being measured is the same across groups or contexts, and that the items are measuring the same underlying construct (De Beer et al., 2022). This is important because, if the metric is not invariant, differences in scores between

groups or contexts may be due to differences in the measurement properties of the instrument rather than true differences in the construct being measured (Bravo et al., 2021).

Scalar Invariance

Investigating whether mean-responses (intercepts) for corresponding items are similar or not across groups or contexts gives us the scalar invariance. In other words, scalar invariance means that the same score on the instrument should represent the same level of the underlying construct across groups or contexts (Throuvala et al., 2021). If the item intercepts, factor loadings, and item residuals are all equal across groups, it is noted as the full scalar invariance, "when the parameters—at least two indicators per construct (i.e., loadings for partial metric invariance and loadings plus intercepts for partial scalar invariance) are equal across groups" (Cieciuch & Davidov, 2015, p. 85). In psychological research, partial scalar invariance was sufficient for making the meaningful comparisons across groups or contexts (Chen, 2007; Chen et al., 2018).

Residual Invariance

Residual invariance is known as strict invariance and refers to the similar item residuals from the metric and scalar invariant levels (Putnick & Bornstein, 2016). In other words, it refers to the degree to which the residuals (i.e., the difference between the predicted values and the observed values) of a statistical model are the same across different subgroups of the data (Zewude & Hercz, 2022).

Latent Mean Differences

If the configural invariance, factor loading invariance, and intercept invariance were established, the latent mean differences across two groups can be examined in a model in which the factor loadings and intercepts were constrained to be equal (Teo et al., 2022). Latent mean difference refers to the difference in the means of the latent variables (i.e., unobserved variables) between two or more groups in MG-CFA (Kim et al., 2022). Assessing the latent mean difference for MI typically involves a series of steps, including testing for configural invariance (i.e., the same factor structure across groups), followed by testing for metric invariance (i.e., the same factor loadings across groups), scalar invariance (i.e., the same intercepts across groups), and, finally,

latent mean invariance (i.e., the same latent means across groups) (Kang & Leung 2022).

Background Information

In Hungary, preschool and kindergarten education is provided free of charge to all children by the government. The kindergarten period spans three years, starting at the age of 3 until the age of 6, with some flexibility in age requirements (Józsa et al., 2018). It is compulsory for children to attend kindergarten for a minimum of 4 h per day from the age of 3, and most children attend for the entire day (Nagy et al., 2018). In 2014, 97% of four-year-old children in Hungary were enrolled in kindergarten (Józsa & Barrett, 2018; OECD 2016). Hungary implements social support for school attendance by offering textbooks at no cost (Langer-Buchwald, 2019).

In Slovakia, compulsory national preschool education was employed, and public education was all free at all levels except for a small charge for meals (Pupala et al., 2022). The government established the first national curriculum in 1964 for ECEC services for 3- to 6-year-old children (Herlina & Indrati, 2010). Currently, up to 93% of kindergartens in Slovakia are in the public sector and are state and local-government funded (Štatistická ročenka–materské školy, 2019). In Slovakia, kindergarten attendance is full-time from eight a.m. to four p.m.; all of that time is educational and organized into segments (European Commission/EaCEa/Eurydice, 2020). Children spend approximately eight hours a day at kindergarten (half-day attendance is also an option, but take-up is limited) (Pupala et al., 2022).

Context of the Current Study

In Hungary, various research studies have been conducted on students' school readiness assessment, focusing on different domains or assessment contents. For instance, several decades ago, the renowned researcher Nagy (1976) conducted a nationwide survey on school readiness using the PREFER (Preventive Development Assessment System for Children) with a sample size of 10,000 participants (Józsa et al., 2022b). The findings were deemed reliable, and the PREFER test became established as a standardized national assessment (Józsa et al., 2022a; Nagy, 1980). Later, beyond the 20th century, Nagy and his colleagues modified the PREFER test into the DIFER (Diagnostic Systems for

Assessing Development) test, involving 23,000 children aged 4–8 years. This test also gained recognition as a criterion-referenced assessment for the entire country (Nagy et al., 2004a). The DIFER test evaluates seven subskills of children's development, including pre-maths, fine motor control, phoneme perception, understanding of cause and effect, deductive reasoning, relational reasoning, and social skills (Józsa et al., 2022a). Subsequently, the DIFER test was computerized and employed in the developmental assessment of children, with researchers utilizing different sub-skill assessments of the DIFER test based on their specific research contexts, as outlined in Table 1.

Table 1 displays numerous studies conducted on school readiness assessments of young Hungarian students using various test formats, including paper-based and computer/tablet-based tests. Among all the studies on school readiness, some are longitudinal studies (Józsa et al. 2022a; Molnár & Hermann, 2023; Putnick & Bornstein, 2016), some are cross-cultural studies (Amukune et al., 2022b; Józsa et al., 2017; Józsa et al., 2022b), and some are simple and national survey studies (Csapó et al., 2014; Józsa & Fenyvesi, 2006; Nagy, 1976; Nagy et al., 2004b). The majority of studies employed the DIFER test to assess different domains/skills related to children's school readiness. However, information on the assessment of psychometric properties of the test, particularly measurement invariance testing, was limited across the studies. One cross-cultural study (Amukune et al., 2022b) examined measurement invariance across countries (Hungary and Kenya) but utilized a different assessment tool called CHEXI instead of DIFER. Another study (Csapó et al., 2014) employed the DIFER test but primarily focused on examining the media effect through measurement invariance analyses. As a result, there is a significant research gap concerning the evaluation of the psychometric properties for the DIFER test.

Thus, the present study aimed to address this research gap by investigating the following research questions:

RQ_1: Do students' abilities align with the ability levels of items in the DIFER test?

RQ_2: What is the extent of the reliability and validity exhibited by the DIFER test?

RQ_3: Are there any noteworthy variations in performance on the DIFER test based on factors such as countries, genders, and ages?

Table 1. Characteristics of children's school readiness assessments in Hungary

Instru-ments	Authors (Time)	Contents/Factors	Assessor	Students	Reliability	MI	Study	Country
PREFER	Nagy (1976)	✓ Mother tongue ✓ Pre-mathematics ✓ Manipulative thinking ✓ Fine motor skills ✓ Self-help ✓ Relational reasoning ✓ Attitude	Teachers/ examiners	Children aged 5–6 years	-	-	National survey	Hungary
DIFER	Nagy et al. (2004a)	✓ Pre-mathematics, ✓ Fine motor skills ✓ Phoneme perception ✓ Comprehension of cause and effect ✓ Deductive reasoning ✓ Relational reasoning ✓ Social skills	Teachers/ examiners	Children aged 4–8 years	Standardi-zed as national test	-	National survey	Hungary
DIFER	Józsa & Fazekasné (2006)	✓ Fine motor skills ✓ Phoneme perception ✓ Relational reasoning ✓ Pre-mathematics skills ✓ Deductive reasoning ✓ Empirical contextual understanding	Teachers	Students with learning disabilities aged 7–8	-	-	Simple survey	Hungary

Instruments	Authors (Time)	Contents/Factors	Assessor	Students	Reliability	MI	Study	Country
Computer-based DIFER	Csapó et al. (2014)	✓ Phoneme perception ✓ Relational reasoning ✓ Pre-mathematics skills ✓ Deductive reasoning ✓ Inductive reasoning	Teachers	First-grade students	Cronbach's alpha	MG-CFA for media effects	Simple survey	Hungary
A game-like, computer-based assessment	Józsa et al. (2017)	✓ Mastery motivation ✓ Executive functions ✓ Pre-academic skills	Trained examiners	Students aged 3–8 years	-	-	Cross-cultural	Hungary and America
DIFER	Józsa & Barrett (2018)	✓ Social skills	Trained examiners	Children aged around 5 years	Cronbach's alpha	-	Longitudinal study	Hungary
DIFER	Józsa et al. (2022b)	✓ Pre-mathematics skills ✓ Phoneme perception ✓ Relational reasoning ✓ Social skills ✓ Fine motor skills	Trained examiners	Preschool children	Cronbach's alpha	-	Longitudinal (8 years)	Hungary
FOCUS app (a game-like tablet-based assessment)	Józsa et al. (2022a)	✓ Mastery motivation ✓ Executive functions ✓ Pre-academic skills	Trained examiners	Students aged 3–8 years	-	-	Cross-cultural	Hungary and Kenya
CHEXI	Amukune, Józsa, et al. (2022)	✓ Working memory ✓ Inhibition ✓ Regulation ✓ Planning	Teachers	Preschool children	Cronbach's alpha	MG-CFA	Cross-cultural	Hungary and Kenya
Computer-based DIFER	Molnár & Hermann (2023)	✓ Pre-mathematics skills ✓ Pre-cursors of reading skills ✓ Inductive reasoning	Trained examiners	First-grade students	EAP reliability	-	Longitudinal study (before/after COVID)	Hungary

Methods

Participants

The study encompassed a sample of young Hungarian students aged 4–8 years residing in Slovakia and Hungary. In total, 382 schools (8 students per school) are included in our study. Therefore, there is a total of 3050 participants (after removing missing information from six participants), with 1609 students from Slovakia (52.75%) and 1441 students from Hungary (47.25%). Of these participants, 1641 were male students (53.82%), while the remaining 1409 students were females (46.18%). The sample was further divided into different age groups, with 282 students (9.24%) being 4 years old, 652 students (21.37%) being 5 years old, 832 students (27.27%) being 6 years old, 690 students (22.62%) being 7 years old, and 594 students (19.48%) being 8 years old. We have organized the participants into distinct categories based on their countries, segmented further by both gender and age groups (Table 2).

Table 2. Number of participants for each country divided by gender and age groups

Variable	Slovakia	Hungary	Total
Number of Participants	1609 (52.75%)	1441 (47.25%)	3050
Gender			
Male	779 (47.5%)	862 (52.5%)	1641
Female	830 (58.87%)	579 (41.13%)	1409
Age			
4th year	159 (56.38%)	123 (43.62%)	282
5th year	370 (56.74%)	282 (43.26%)	652
6th year	429 (51.56%)	403 (48.44%)	832
7th year	351 (50.87%)	339 (49.13%)	690
8th year	300 (50.51%)	294 (49.49%)	594

Instrument and Procedure

To measure Hungarian students from both Hungary and Slovakia, an assessment called DIFER (Diagnostic Systems for Assessing Development) is

employed for children aged 4–8 years (Nagy et al., 2004a). This assessment test serves as a widely accepted evaluation of children's school readiness. DIFER is designed to assist educators in fostering the development of six crucial skills necessary for school-based learning (Nagy et al., 2004b). These skills encompass (1) pre-mathematics (58 items), (2) fine motor skills (24 items), (3) phoneme perception (15 items), (4) deductive reasoning (16 items), (5) relational reasoning (24 items), and (6) social skills (20 items). In total, the DIFER test includes 157 items. These skill assessments of DIFER test were divided into two types of assessment: dichotomous test and rating test. The DIFER test battery underwent establishment via a nationally representative sample comprising over 23,000 children aged 4–8 years (Nagy et al., 2004b). The DIFER program package follows a criterion-based approach, wherein a predetermined criterion for each skill is established. When the attainment of this criterion for a specific skill is identified, the skill is progressed, leading to its optimal functioning. Moreover, the program is diagnostic in nature, as it furnishes insights into every facet of skill acquisition levels. The diagnostic map for skill development delineates the components of a skill that a child has already mastered and those that require further enhancement. Attaining a test with successful outcomes denotes the comprehensive and optimal acquisition and practice of skills, exemplified by nearly perfect results around 100%. In simpler terms, a child's developmental stage is inferred based on the established optimal criterion for the particular skill. The tests were administered by trained MA in Education students in two face-to-face sessions, taking an average of 15–20 min per session. In addition, the study's ethical approval was obtained by the University Ethics Committee.

Dichotomous Test of DIFER

Teachers or examiners assessed students' school readiness skills (pre-mathematics, fine motor skills, phoneme perception, deductive reasoning, and relational reasoning) using dichotomous scaled questions. An example image of the test situation is provided below (Figure 1).

Figure 1. An example of dichotomous test and the test situation

Rating Test of DIFER

The assessment of social skills in the DIFER test involved examiners or teachers using a five-point rating scale to evaluate students' school readiness. An illustrative image of the assessment format is presented below (Figure 2).

SOCIALITY
(Abridged, illustrative version)

ASSOCIATE TASK SITUATION (fine motor skills)
After the written task has been explained in detail, we emphasize the so-called delayed instruction:
"Those who have completed the tasks should sit still and wait quietly until I collect the completed sheets."
When everyone has finished copying, **we keep them waiting at the table for another minute.**

Relationship with peers:
5=has a positive effect on his peers, 4=does not allow himself to be disturbed, 3=can be influenced, 2=disturbing, 1=provocative

Keeping the delayed instruction:
5=positive effect on peers, 4=good self-discipline, 3=impatient, 2=undisciplined, 1=would leave

Figure 2. An example of rating test

Analysis

Conquest and Winsteps software programs were utilized in this study to conduct Rasch analysis. To evaluate the quality of the DIFER test, separation values were examined, with values greater than 2 logits being considered desirable. A higher separation index indicates higher test quality, as outlined by Planinic et al. (2019). The mean square values of infit and outfit (MNSQ) were also considered, with an acceptable range typically falling between 0.5 and 1.5, although values up to 1.6 can still be regarded as acceptable. Additionally, the idea values for fit criteria were expected to be close to 1.00 logits. Furthermore, the raw residual correlation between pairs of items was evaluated, with a threshold of less than 0.3 being deemed acceptable (Boone et al., 2014). This study employed MG-CFA using SmartPLS4 and Mplus8 software packages, with additional reliability and validity measures conducted using IBM SPSS Statistics 23.0. The model fit was evaluated based on recommended fit indices; $\chi^2/df < 5$, RMSEA < 0.06, SRMR < 0.08, TLI > 0.90, and CFI > 0.90 (Oo et al., 2021). The invariance of the test was assessed by a change in CFI (ΔCFI) of less than 0.01, a change in SRMR (ΔSRMR) of less than 0.03, and a change in RMSEA (ΔRMSEA) of less than 0.015, indicating the evidence of metric, scalar, and residual invariances (Bravo et al., 2021; Gygi et al., 2016; Throuvala et al., 2021).

Preliminary Analyses

Before conducting our main analyses, we conducted preliminary checks on the data to address missing values and assess normality. After handling any missing values in our dataset, we examined the normality of the data using skewness and kurtosis values. We found that all dimensions of the DIFER test fell within the acceptable range of −2 and +2 (Table 3), indicating that they satisfied the assumption of normality (Kline, 2015).

Table 3. Preliminary analyses for the school readiness assessment

DIFER	Fine Motor	Phoneme Perception	Pre-Maths	Relational Reasoning	Deductive Reasoning	Social Skills	Total
N of items	24	15	58	24	16	20	157
Mean	13.08	12.4	40.55	19.54	10.63	81.16	71.97
SD	6.6	2.59	12.7	3.86	4.12	12.77	16.04
Skewness	−0.04	−1.18	−0.64	−1.12	−0.77	−0.723	0.64
Kurtosis	−0.949	1.36	−0.43	1.7	−0.05	0.51	−0.02

Results

Addressing RQ 1

The primary objective of this research question was to examine the item-person parameters, which would shed light on the relative difficulty or ease of specific items in the DIFER school readiness test. The DIFER assessment comprises two types of tests, namely, a dichotomous test (evaluating five domains: fine motor skills, phoneme perception skills, pre-mathematics skills, relational reasoning skills, and deductive reasoning skills) and a rating test (assessing the social skills domain). To conduct our analysis, we employed the Rasch analysis through the Conquest program, generating two models (item-person maps) for the DIFER school readiness assessment (Figure 3).

Figure 3 presents a visual depiction of the analysis outcomes. The left-hand sides of the graphs portray the students' achievement levels or ability points, while the right-hand sides signify the difficulty levels of the test items. Notably, the graphs illustrate that students tended to exhibit higher achievement on items of moderate difficulty, indicating their proficiency in tackling items that neither posed excessive difficulty nor were excessively easy. However, it is worth highlighting that within the dichotomous test, five items (numbered 40, 41, 42, 43, and 44) belonging to the assessment of children's fundamental arithmetic skills (pre-mathematics skills) emerged as the easiest items, as evidenced by their remarkably low item discrimination scales, which ranged from 0.09 to 0.19. A discrimination value close to zero for these specific items suggests that they do not effectively differentiate between respondents of varying levels within the construct being measured by the DIFER test (Zwick et al., 1999). As

a result, we opted to exclude these five items from the assessment of school readiness using the DIFER test to ensure its construct validity.

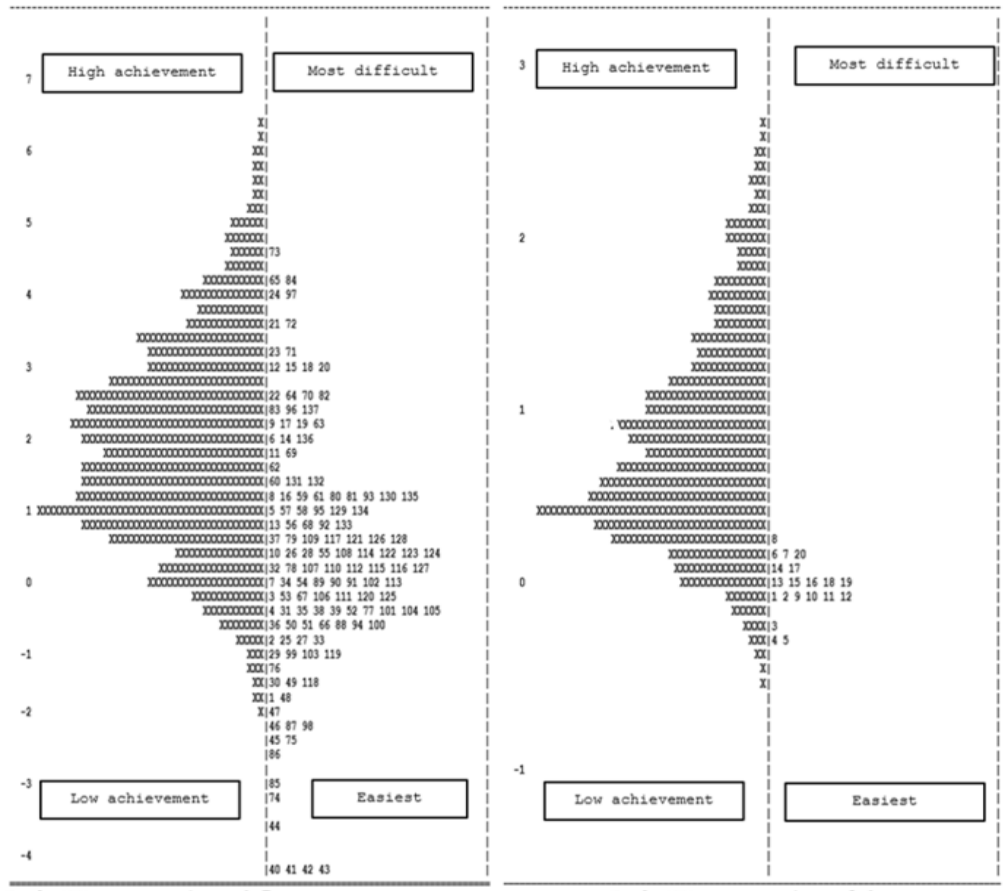

Figure 3. Item-person maps of DIFER

Differential Item Functioning (DIF) for Age Groups

Subsequent to the elimination of the five least challenging question items from the dichotomous test, a differential item functioning (DIF) analysis of the DIFER test was performed using the Rasch model. This analysis aimed to probe how the test items operate in the context of distinct age groups, namely, the 4th, 5th, 6th, 7th, and 8th years. DIF evaluation can be approached from distinct methods; (1) through the consideration of statistically significant probability (*p*

< 0.05), and (2) by examining the magnitudes of DIF. The classification of DIF magnitudes comprises three levels: minimal, slight to moderate (with/DIF/ ≥ 0.43 logits), and moderate to substantial (with/DIF/≥ 0.64 logits) (Zwick et al., 1999). The outcomes of this analysis indicated that the DIF logits significantly (* $p < 0.05$) fell within the range of 0.37 and −0.20 for the 4th-year age group; 0.29 and −0.12 for the 5th-year age group; 0.15 and −0.09 for the 6th-year age group; 0.09 and −1.23 for the 7th-year age group; and +0.18 and −0.29 for the 8th-year age group. It means that the DIFER test is significantly discriminative for different age groups, but negligible to change the items, recommended by Zwick et al. (1999) . These findings potentially underlie the transformative impact of students' age-related developmental shifts or their overarching general cognitive ability (g).

Multidimensional Rasch Analysis

Moreover, we proceeded with a comprehensive multidimensional Rasch analysis to investigate the item-person parameters associated with the DIFER school readiness test. The validity of item and person fit was assessed using the root mean square (MNSQ) for infit/outfit measures, which fell within the recommended range of 0.5 to 1.15 as suggested by Andrich (2018). Since our sample consisted of more than 3000 students (Azizan et al., 2020), the z-standardized (ZSTD) infit/outfit measures for persons and items were not considered, as they tend to be less informative in larger samples where person abilities as latent traits can be differentiated. The item separation analysis indicated that all domains of the DIFER test contained a range of easy and difficult items, confirming its content validity (Boone et al., 2014). For this study, we evaluated each subtest (as unidimensional models) within the multidimensional model, following the recommendation by Bond et. al. (2015). The DIFER test was deemed suitable for assessing children's school readiness based on an underlying construct consisting of distinct yet related dimensions. We also assessed unidimensionality and local independence. The raw variance by measure values for all tasks can be found in Table 4. The results demonstrated that the DIFER test achieved a satisfactory threshold of over 30% (Gliner et al., 2017). Moreover, the unexplained variance for the first contrast values was below 2 for all domains of the DIFER test, confirming unidimensionality and indicating that the test encompassed nearly all relevant dimensions based on the students' readiness assessment. Local independence

was supposed, signifying that each item in the DIFER test was independent. To determine local independence, we examined the raw residual correlation between item pairs. According to Boone et al. (2014), a raw residual correlation between item pairs below 0.3 is considered acceptable. Our results showed that the items from different domains of the DIFER test had residual correlations ranging from 0.09 to 0.29, which further supported the assumption of acceptable local independence.

Table 4. Summary for the Rasch parameters for the school readiness test, DIFER

Psychometric Properties	**Fine Motor Skills**	**Phoneme Perception**	**Pre-Maths**	**Relational Reasoning**	**Deductive Reasoning**	**Social Skills**
N of items	24	15	53	24	16	20
Mean	0.29	2.16	1.74	1.54	79	2.14
SD	1.94	1.43	2.66	0.98	1.29	1.59
MNSQ (item-infit)	0.99	1	0.98	1.00	1.01	0.99
MNSQ (item-outfit)	1.11	0.97	1.99	1.00	0.98	1.01
MNSQ (person-infit)	0.99	1.00	0.97	1.00	1.00	1.01
MNSQ (person-outfit)	1.04	0.97	1.2	1.00	0.98	1.01
Item separation	32.33	10.11	35.90	11.05	14.80	14.78
Person separation	2.79	2.72	4.26	3.44	2.65	3.07
Unidimensionality						
Raw variance by measure	34.50%	38.2%	38.3%	38%	40.36%	61.26%
Unexplained variance 1**st** contrast	1.45	1.42	1.13	1.62	1.84	1.32

Addressing RQ 2

This research question aims to examine the reliability and validity of the DIFER test, a criterion-referenced test of school readiness in Hungary. We utilized IBM SPSS Statistics 23.0 to measure the reliabilities, means, standard deviations, and correlations. The Kaiser–Meyer–Olkin (KMO) test indicated the appropriateness of the data for the factor analysis. The DIFER test yielded a very good KMO value (KMO = 0.826). As per Gliner at al. (2017), a KMO value above 0.5 is acceptable, while a value above 0.7 is considered good. Hence, all dimensions of the school readiness DIFER test were deemed suitable for further analysis in assessing the reliability of the school readiness DIFER test.

Our findings revealed a good model fit, as indicated by non-significant chi-square ($\chi 2$) values and positive degrees of freedom (df), demonstrating the appropriateness of the DIFER test for assessing students' school readiness. The fit indices, including the standardized root mean square residual (SRMR), comparative fit index (CFI), and root mean square error of approximation (RMSEA), were consistent with Kline's (2015) recommendations and indicated a good model fit for the models (Table 5). Specifically, the SRMR provided a measure of the discrepancy between the observed and model-implied covariance matrices in the DIFER test. The CFI compared the fit of the hypothesized model to a baseline model, indicating how well the hypothesized model fit the observed data. The RMSEA described the amount of unexplained variance or error remaining after applying the model.

In our CFA models as depicted in Figure 4, we examined the item-factor correlation coefficients ranging from 0.46 to 0.84. It is important to note that, despite including all the items from the dichotomous model in the analysis, they were omitted from the visual representation due to the large number of items (132 items) and to enhance the clarity of the unobserved domain variables. Our CFA models suggest the close relations between items and factors, supporting the development of strong constructs for both the dichotomous and rating versions of the DIFER school readiness assessment. Based on these results, we can conclude that the models are suitable for estimating the related measures of the school readiness assessment.

Table 5. Model fit measures for the DIFER assessment

DIFER	**Items**	**Chisqr/df**	***p* Value**	**Absolute Index, SRMR (<0.08 *)**	**Comparative Index, CFI (>0.90 *)**	**Parsimonious Index, RMSEA (<.06 *)**
Dichotomous test	132	2.85	0.052	0.08	0.90	0.057
Rating test	20	2.50	0.073	0.07	0.92	0.046

*Note: * shows the recommended values.*

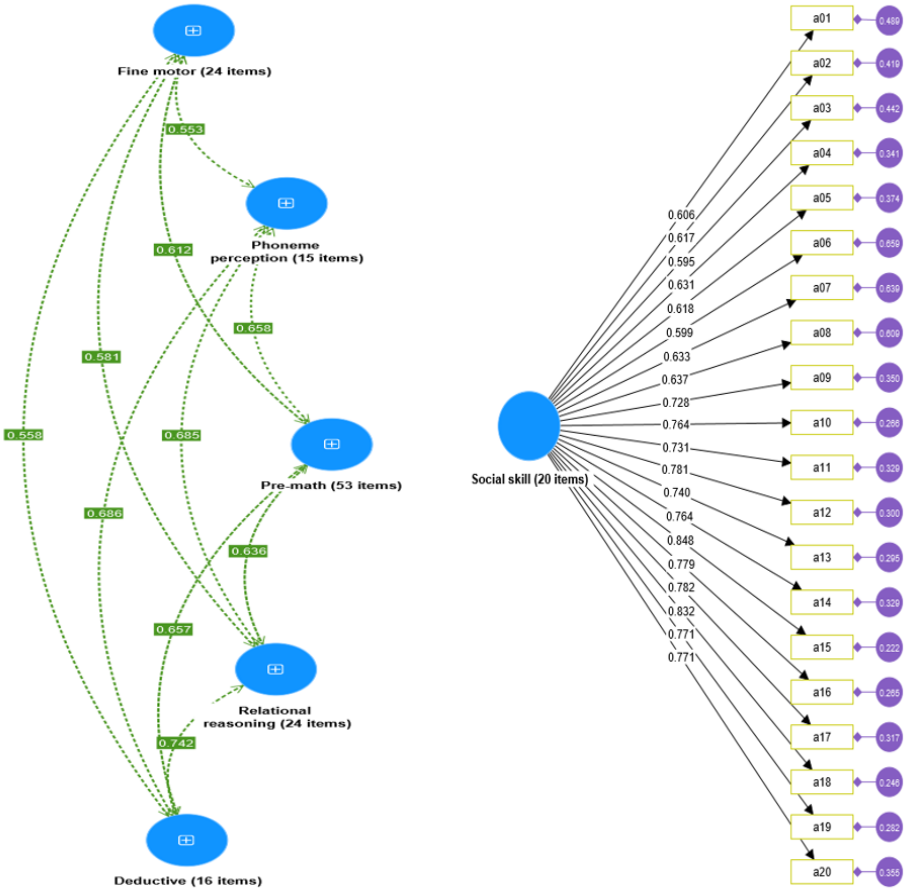

Figure 4. CFA model for five dimensions of DIFER (N = 3050)

Correlational Changes among Factors for Different Age Groups

We have previously established the significant variations in DIF sizes or distinct evaluations across diverse age groups (4th, 5th, 6th, 7th, and 8th years), as presented earlier. Despite the observed substantial DIFER test differences among these age groups, we maintain the consistency of the factor structures across the age spectrum, primarily because the DIF sizes remained within the recommended parameters (/DIF/ ≤ 0.43).

Expanding on this, we extended our investigation to the correlations within the unaltered factor structures for the different age groups. This exploration aimed to quantify the range of differences in the correlations among the various factors within distinct age groups. For the 4th-year age group, the correlations spanned from low (r = 0.284) to moderate (r = 0.55) levels. Similarly, the 5th-year age group exhibited correlations ranging from low (r = 0.282) to moderate (0.512) levels. The 6th-year age group's correlations ranged from low (r = 0.301) to moderate (r = 0.524) levels. The 7th-year age group showed correlations from low (r = 0.237) to moderate (r = 0.540) levels, while the 8th-year age group displayed correlations from low (r = 0.273) to moderate (r = 0.559) levels (Table 6).

These findings suggest that the presence of 'g' does not significantly vary among different age groups. It is reasonable to infer that the overall cognitive capability, commonly referred to as 'g,' exhibits minor fluctuations across different age groups in relation to their performance in the DIFER school readiness assessment tests. However, it is important to acknowledge that subtle variations in the 'g' effect among age groups might still exist, albeit not to a substantial degree.

Then, to ensure the construct validity of the DIFER, another examination was also conducted to determine if the behavior of the construct aligned with the theories mentioned earlier. Convergent validity and discriminant validity were assessed to establish the construct validity of the factors. Following the criteria proposed by Fornell & Larcker (1981) and Oo et al. (2023), factors within the same construct are considered valid if the average variance extracted (AVE) value exceeds 0.50, and their CR values exceeded 0.70, confirming convergent validity (Table 7). The evaluation of discriminant validity was constructed by employing the HTMT ratio as proposed by Henseler et al. (2015) . The outcomes are presented in Table 8, demonstrating values spanning from 0.41 to 0.77. As all the values are below 0.85, the DIFER test demonstrated good discriminant validity. Based on the presented information regarding the reliability and validity assessments of the DIFER test, it can be inferred that the test is reliable and valid for measuring students' school readiness.

Table 6. Factor correlations for different age groups

Age 4	**2**	**3**	**4**	**5**	**6**
1. Social skills	0.284 **	0.446 **	0.374 **	0.432 **	0.452 **
2. Fine motor skills		0.256 **	0.282 **	0.306 **	0.357 **
3. Phoneme perception			0.577 **	0.504 **	0.526 **
4. Relational reasoning				0.489 **	0.486 **
5. Deductive reasoning					0.529 **
6. Pre-maths skills					
Age 5	2	3	4	5	6
1. Social skills	0.282 **	0.381 **	0.367 **	0.413 **	0.465 **
2. Fine motor skills		0.324 **	0.305 **	0.292 **	0.429 **
3. Phoneme perception			0.512 **	0.479 **	0.473 **
4. Relational reasoning				0.500 **	0.510 **
5. Deductive reasoning					0.485 **
6. Pre-maths skills					
Age 6	2	3	4	5	6
1. Social skills	0.301 **	0.351 **	0.413 **	0.425 **	0.334 **
2. Fine motor skills		0.334 **	0.279 **	0.335 **	0.430 **
3. Phoneme perception			0.465 **	0.462 **	0.504 **
4. Relational reasoning				0.515 **	0.524 **
5. Deductive reasoning					0.464 **
6. Pre-maths skills					
Age 7	2	3	4	5	6
1. Social skills	0.237 **	0.414 **	0.373 **	0.417 **	0.358 **
2. Fine motor skills		0.274 **	0.318 **	0.314 **	0.457 **
3. Phoneme perception			0.487 **	0.447 **	0.485 **
4. Relational reasoning				0.540 **	0.463 **
5. Deductive reasoning					0.453 **
6. Pre-maths skills					
Age 8	2	3	4	5	6
1. Social skills	0.273 **	0.373 **	0.349 **	0.393 **	0.440 **
2. Fine motor skills		0.289 **	0.274 **	0.264 **	0.330 **
3. Phoneme perception			0.559 **	0.533 **	0.441 **
4. Relational reasoning				0.505 **	0.543 **
5. Deductive reasoning					0.434 **
6. Pre-maths skills					

*Note: ** $p < .01$.*

Table 7. Convergent validity of DIFER

Dimensions	**N of Items**	**Mean (SD)**	**Cronbach's Alpha (>0.60) ***	**CR (>0.70) ***	**AVE (>0.50) ***
Fine motor skills	24	13.08 (6.60)	0.92	0.72	0.50
Phoneme perception	15	12.40 (2.59)	0.74	0.92	0.63
Pre-mathematics	53	40.55 (12.70)	0.95	0.96	0.65
Relational reasoning	24	19.54 (3.86)	0.80	0.86	0.55
Deductive reasoning	15	10.68 (4.12)	0.86	0.71	0.50
Social skills	20	81.16 (12.77)	0.95	0.94	0.51
Total	152	71.97(16.04)	0.97	0.86	0.55

Note: * shows the *recommended values.*

Table 8. HTMT ratio for the discriminant validity of DIFER

Construct	**1**	**2**	**3**	**4**	**5**	**6**
1. Fine motor skills		0.69	0.76	0.68	0.73	0.41
2. Phoneme perception			0.74	0.66	0.77	0.54
3. Relational reasoning				0.74	0.72	0.48
4. Deductive reasoning					0.69	0.47
5. Pre-mathematics						0.50
6. Social skills						

Note: HTMT (heterotrait–monotrait) ratio = average heterotrait–heteromethod correlations/square root of (average monotrait–heteromethod correlation of (first construct) × (second construct)).

Addressing RQ 3

The third research question examines the measurement invariance of the school readiness DIFER test across different groups, including country, gender, and age of students. To establish a comparison standard for measurement invariance across these groups, a baseline model was initially constructed. Due to the use of two different tests in the DIFER assessment (dichotomous test and rating test), separate analyses of measurement invariance were conducted for each test.

Initially, the measurement invariance of the dichotomous test model was assessed within each group (country, gender, and age level), where no correlations among measurement errors were considered. However, the results of this analysis were unsatisfactory in terms of assessing the measurement invariance of the DIFER test (CFI = 0.760, RMSEA = 0.082, and SRMR = 0.092). Consequently, the next step involved analyzing the modification indices for each sample, allowing for correlations among measurement errors, as suggested by Kline (2015). The main objective at this stage was to identify a baseline model that would adequately fit all groups (country, gender, and age level) and establish measurement invariance. To achieve this, fit indices were calculated for the model with correlated errors within each sample for both the dichotomous test and the rating test of the DIFER. Correlations among measurement errors of specific items within the same factors were introduced for the dichotomous test (R6 and R7, R26 and R27, R27 and R28, and R43 and R44). Following the introduction of these correlations, the CFA model was re-evaluated, resulting in a good model fit for all dimensions of the dichotomous test. Similarly, for the rating test of DIFER, measurement errors of certain items were correlated (a04 and a05, a07 and a08, a15 and a18, and a16 and a19) to achieve a good fit for measuring variances across different groups. Consequently, a good model fit was attained for each group based on country, gender, and age levels, as indicated in Table 9.

Table 9. Fit indices of baseline model for each group of country, gender, and age levels

DIFER	Groups	χ2 (df)	CFI	RMSEA [90% CI]	SRMR
Dichotomous test	Slovakia	145,555.9 (17,005)	0.942	.050 [0.050, 0.050]	0.060
	Hungary	145,586.9 (17,005)	0.943	.050 [0.050, 0.050]	0.060
	Male	117,642.8 (8778)	0.948	.051 [0.049, 0.052]	0.060
	Female	114,522.7 (8778)	0.949	.050 [0.049, 0.052]	0.059
	4th year	117,882.8 (17,002)	0.912	.060 [0.059, 0.062]	0.063
	5th year	117,892.7 (17,002)	0.912	.060 [0.059, 0.062]	0.063
	6th year	118,222.8 (17,002)	0.911	.058 [0.058, 0.058]	0.060
	7th year	117,892.7 (17,002)	0.932	.058 [0.058, 0.058]	0.061
	8th year	118,222.8 (17,002)	0.921	.057 [0.055, 0.060]	0.065
Rating test	Slovakia	72774.0 (210)	0.931	.065 [0.063, 0.066]	0.063
	Hungary	69876.9 (210)	0.931	.065 [0.065, 0.065]	0.061
	Male	7051.8 (210)	0.939	.063 [0.060, 0.065]	0.062
	Female	7308.7 (210)	0.940	.060 [0.058, 0.062]	0.060
	4th year	3907.1 (210)	0.943	.039 [0.059, 0.062]	0.034
	5th year	3831.8 (210)	0.947	.043 [0.041, 0.044]	0.033
	6th year	3994.1 (210)	0.965	.038 [0.037, 0.040]	0.044
	7th year	4045.6 (239)	0.914	.047 [0.046, 0.048]	0.049
	8th year	5515.2 (265)	0.922	.039 [0.038, 0.040]	0.042

Measurement Invariance across Countries

The measurement invariance of the DIFER test across Slovakia and Hungary was examined through a series of analyses. Initially, the configural model was assessed, which demonstrated a strong baseline model fit for all indices in both the dichotomous and rating tests, as indicated in Tables 10 and 11. Subsequently, metric invariance was evaluated by constraining the factor loadings to be equal across Hungarian students in both countries. Importantly, the comparison between the configural and metric models revealed no significant decrease in fit, indicating the full invariance of factor loadings across countries in both test formats (ΔCFI = −0.001, −0.001, ΔRMSEA = −0.001, and ΔSRMR = −0.002). Further analysis focused on scalar invariance, where the intercepts of all items were constrained to be the same across the groups. Once again, the results demonstrated that the fit of the models did not significantly decrease in both the dichotomous and rating tests (ΔCFI = −0.002, ΔRMSEA = 0.000, and ΔSRMR = −0.002). To assess residual invariance, item residuals were constrained in the partial scalar model. Encouragingly, the fit indices supported the adequacy of this residual model (ΔCFI = −0.001, ΔRMSEA = 0., and ΔSRMR = −0.001), showing intercepts and residual variances exhibited partial invariance across countries. These findings align with the recommended thresholds for metric, scalar, and residual invariance (ΔCFI < 0.01) (ΔSRMR < 0.03) (ΔRMSEA < 0.015) as outlined by Kline (2015). Accordingly, it indicates that the overall measurement invariance of the DIFER test between Slovakia and Hungary was upheld.

Table 10. Testing measurement invariance of DIFER (dichotomous test) across country, gender, and age

Models	χ^2 (df)	CFI	RMSEA [90% CI]	SRMR	ΔCFI	ΔRMSEA	ΔSRMR	MI
MI across country ($N_{Slovakia}$ = 1609; $N_{Hungary}$ = 1441)								
Configural	145,587.9 (17,008)	0.942	0.050 [0.050, 0.050]	0.060	-	-	-	-
Metric	146,010.3 (17,135)	0.941	0.050 [0.046, 0.050]	0.060	−0.001	0.000	0.000	Yes
Scalar	146,640.7 (17,267)	0.939	0.050 [0.046, 0.050]	0.057	−0.002	0.000	−0.003	Yes
Residual	146,653.8 (17,282)	0.938	0.050 [0.046, 0.050]	0.058	−0.001	0.000	0.001	Yes
MI across gender (N_{male} = 1641; N_{female} = 1409)								
Configural	117,642.8 (8778)	0.947	0.049 [0.049, 0.049]	0.056	-	-	-	-
Metric	116,114.5 (17,402)	0.947	0.049 [0.049, 0.049]	0.056	0.000	0.000	0.000	Yes
Scalar	146,114.5 (17,402)	0.947	0.049 [0.049, 0.049]	0.057	0.000	0.001	0.001	Yes
Residual	146,122.4 (17,408)	0.946	0.047 [0.045, 0.048]	0.053	−0.001	−0.001	−0.004	Yes
MI across age (N_{year4} = 282; N_{yeat5} = 652; N_{yeat6} = 832; N_{yeat7} = 690; N_{yeat8} = 594)								
Configural	116,845.9 (17,477)	0.921	0.059 [0.057, 0.060]	0.056	–	–	–	–
Metric	116,779.5 (17,489)	0.920	0.059 [0.055, 0.059]	0.056	−0.001	0.000	0.000	Yes
Scalar	146,884.5 (17,405)	0.920	0.050 [0.049, 0.050]	0.057	0.000	0.009	0.001	Yes
Residual	146,799.4 (17,411)	0.900	0.067 [0.077, 0.078]	0.079	−0.020	0.017	0.022	No
Residual (item74)	146,712.8 (17,400)	0.912	0.048 [0.046, 0.050]	0.055	−0.008	−0.002	−0.008	Yes

Table 11. Testing measurement invariance of DIFER (rating test) assessment across country, gender, and age

Models	χ2 (df)	CFI	RMSEA [90% CI]	SRMR	ΔCFI	ΔRMSEA	ΔSRMR	MI
MI across country ($N_{Slovakia}$ = 1609; $N_{Hungary}$ = 1441)								
Configural	4090.4 (298)	0.930	0.063 [0.050, 0.050]	0.062	–	–	–	–
Metric	4130.7 (317)	0.929	0.062 [0.061, 0.065]	0.060	−0.001	−0.001	−0.002	Yes
Scalar	4247.5 (337)	0.929	0.062 [0.060, 0.063]	0.060	0.000	0.000	0.000	Yes
Residual	4248.6 (332)	0.929	0.062 [0.060, 0.063]	0.060	0.000	0.000	0.000	Yes
MI across gender (N_{male} = 1641; N_{female} = 1409)								
Configural	3550.5 (298)	0.939	0.058 [0.049, 0.052]	0.06	–	–	–	–
Metric	3574.5 (317)	0.938	0.057 [0.056, 0.060]	0.056	−0.001	−0.001	−0.004	Yes
Scalar	3653.3 (337)	0.938	0.057 [0.055, 0.058]	0.055	0.000	0.000	−0.001	Yes
Residual	3661.5 (338)	0.936	0.054 [0.053, 0.056]	0.053	−0.002	−0.003	−0.002	Yes
MI across age (N_{year4} = 282; N_{yeat5} = 652; N_{yeat6} = 832; N_{yeat7} = 690; N_{yeat8} = 594)								
Configural	5533.8 (1007)	0.912	0.038 [0.037, 0.039]	0.035	–	–	–	–
Metric	5654.8 (1027)	0.910	0.038 [0.037, 0.039]	0.035	−0.002	0.000	0.000	Yes
Scalar	5654.8 (1028)	0.910	0.038 [0.037, 0.039]	0.034	0.000	0.000	0.001	Yes
Residual	5792.6 (1069)	0.908	0.038 [0.037, 0.039]	0.034	−0.002	0.000	0.000	Yes

Measurement Invariance across Genders

The adequacy of the configural model in representing the hypothesized relationships in the DIFER test for school readiness across gender was assessed. Both the dichotomous and rating tests of DIFER exhibited good model fits across all examined models, including configural, metric, scalar, and residual. The comparison between the configural and metric models met the predefined thresholds for fit indices (ΔCFI = −0.001; ΔRMSEA = −0.001; and ΔSRMR = −0.002). There was no significant decrease in fit observed between the metric and scalar models (ΔCFI = 0, ΔRMSEA = 0.001, and ΔSRMR = 0.001, −0.001). Furthermore, the fit indices of the residual invariance model were not significantly different from those of the scalar invariance model (ΔCFI = −0.001, −0.002; ΔRMSEA = −0.001, −0.003; and ΔSRMR = −0.004, −0.002), as presented in Tables 10 and 11. These findings suggest that the DIFER test maintains its measurement invariance across gender, supporting its reliability and validity in assessing school readiness.

Measurement Invariance across Ages

The investigations into measurement invariance across different age groups (4th, 5th, 6th, 7th, and 8th) revealed that the configural, metric, and scalar models of both the dichotomous and rating tests demonstrated a good fit across all age groups (Tables 10 and 11). However, when examining the full scalar or residual invariance of the dichotomous test, the fit indices indicated that the intercepts were not equal among the age groups (ΔCFI = −0.020, ΔRMSEA = 0.017, and ΔSRMR = 0.022) (Table 10). To identify the specific item causing the misfit, we released the constraint on each intercept and found that item74, related to the pre-mathematics skills, was responsible for the change in CFI and RMSEA. By allowing this intercept to vary freely, there was no significant change in fit between metric and partial scalar models (ΔCFI = −0.009, ΔRMSEA = 0.002, and ΔSRMR = 0.004). Therefore, we can conclude that there is partial invariance (all parameters are equal, but only item74 is variant) across the age groups of children in the DIFER assessment. These findings provide valuable insights into the measurement properties of the test (such as configural, metric, scalar, and residual) across different age groups.

Latent Mean Differences

The intercepts of the observed variables of the DIFER test were equated across countries, genders, and ages, allowing for a meaningful comparison of latent means among young children. Notably, the measurement models presented in Tables 8 and 9 displayed a satisfactory fit for scalar invariance across these factors, affirming the accuracy of the estimates obtained through this approach. Delving into the DIFER school readiness test, which encompassed six distant domains, intriguing findings emerged. Young students from Hungary exhibited a remarkable superiority in fine motor skills and social skills, surpassing their Slovakian counterparts by a significant margin (z = 7.173; z = 13.188). However, the tides shifted when it came to the remaining four skills—phoneme perception, pre-mathematics, relational reasoning, and deductive reasoning—where the latent abilities of Slovakian students surpassed those of their Hungarian peers. When dissecting the gender groups, a captivating distinction surfaced. Male students displayed a noteworthy advantage in fine motor skills (z = 9.462) and deductive reasoning skills (z = 10.943) compared to their female counterparts, highlighting their innate prowess in these areas ($p < .001$). However, no substantial disparities were detected in the remaining skills, indicating a relatively balanced distribution of latent abilities across genders (see Table 12).

Furthermore, an intriguing pattern emerged as we explored different age groups (4th, 5th, 6th, 7th, and 8th years) among young children. Evidently, a clear progression in latent abilities unfolded, with each higher age groups (6th, 7th, and 8th) demonstrating superior latent ability, e.g., in the pre-mathematics skills (z = 15.820), compared to the lower age groups (4th and 5th) (z = 8.097, $p < .001$). This compelling observation implies that, as children mature and advance in age, their latent abilities tend to flourish, culminating in a progressively enhanced skill set. Overall, these captivating insights shed light on the nuanced variations in latent abilities across countries, genders, and age groups, illuminating the diverse facets of young children's developmental trajectories.

Table 12. Comparison of latent mean differences on DIFER scales

Group	DIFER Scales	Estimate	SE	CR Score	*p*
Country (Slovakia vs. Hungary)	Fine motor	0.004	0.001	6.166 (7.173)	<.001
	Phoneme perception	0.007	0.001	5.308 (4.968)	<.001
	Pre-mathematics	0.004	0.001	7.466 (7.007)	<.001
	Relational reasoning	0.002	0.000	3.226 (2.918)	<.01
	Deductive reasoning	0.047	0.005	10.047 (9.629)	<.001
	Social skills	0.251	0.021	12.024 (13.188)	<.001
Gender (Male vs. Female)	Fine motor	0.006	0.001	9.462 (8.233)	<.001
	Phoneme perception	0.007	0.001	7.264 (8.454)	<.001
	Pre-mathematics	0.005	0.000	10.331 (11.45)	<.001
	Relational reasoning	0.001	0.000	4.364 (4.671)	<.001
	Deductive reasoning	0.046	0.003	10.943 (9.842)	<.001
	Social skills	0.295	0.023	12.896 (12.040)	<.001
4th year vs. 5th year	Fine motor	0.006	0.001	9.462 (9.233)	<.001
	Phoneme perception	0.007	0.001	7.264 (8.454)	<.001
	Pre-mathematics	0.260	0.032	8.097 (8.079)	<.001
	Relational reasoning	0.001	0.000	4.364 (4.671)	<.01
	Deductive reasoning	0.046	0.003	10.943 (9.842)	<.001
	Social skills	0.282	0.018	15.820 (15.820)	<.001
4th year vs. 6th year	Fine motor	0.006	0.001	9.462 (10.243)	<.001
	Phoneme perception	0.007	0.001	7.264 (7.474)	<.001
	Pre-mathematics	0.260	0.032	8.097 (9.179)	<.001
	Relational reasoning	0.001	0.000	4.364 (5.672)	<.001
	Deductive reasoning	0.046	0.003	10.943 (11.892)	<.001
	Social skills	0.282	0.018	15.820 (15.820)	<.001
4th year vs. 7th year	Fine motor	0.006	0.001	9.462 (9.244)	<.001
	Phoneme perception	0.007	0.001	7.264 (11.459)	<.001
	Pre-mathematics	0.260	0.032	8.097 (9.079)	<.001
	Relational reasoning	0.001	0.000	4.364 (5.671)	<.01
	Deductive reasoning	0.046	0.003	10.943 (11.842)	<.001
	Social skills	0.282	0.018	15.820 (15.820)	<.001
4th year vs. 8th year	Fine motor	0.006	0.001	9.462 (11.256)	<.001
	Phoneme perception	0.007	0.001	7.264 (9.334)	<.001
	Pre-mathematics	0.260	0.032	8.097 (8.979)	<.001
	Relational reasoning	0.001	0.000	4.64 (4.699)	<.001
	Deductive reasoning	0.046	0.003	10.943 (9.842)	<.05
	Social skills	0.282	0.018	15.820 (15.820)	<.001
5th year vs. 6th year	Fine motor	0.349	0.021	16.820 (16.999)	<.001
	Phoneme perception	0.288	0.017	17.425 (18.898)	<.001
	Pre-mathematics	0.270	0.017	15.447 (11.453)	<.001
	Relational reasoning	0.312	0.020	15.677 (14.679)	<.001
	Deductive reasoning	0.279	0.016	17.029 (19.842)	<.001
	Social skills	0.295	0.023	12.896 (12.870)	<.001

Group	DIFER Scales	Estimate	SE	CR Score	*p*
5th year vs. 7th year	Fine motor	0.349	0.021	16.820 (18.779)	<.001
	Phoneme perception	0.288	0.017	17.425 (18.890)	<.001
	Pre-mathematics	0.270	0.017	15.447 (15.665)	<.001
	Relational reasoning	0.312	0.020	15.677 (18.556)	<.01
	Deductive reasoning	0.279	0.016	17.029 (19.842)	<.001
	Social skills	0.295	0.023	12.896 (12.870)	<.001
5th year vs. *8th year*	Fine motor	0.349	0.021	16.820 (17.001)	<.001
	Phoneme perception	0.288	0.017	17.425 (20.448)	<.001
	Pre-mathematics	0.270	0.017	15.447 (19.677)	<.001
	Relational reasoning	0.312	0.020	15.677 (18.679)	<.01
	Deductive reasoning	0.279	0.016	17.029 (19.842)	<.001
	Social skills	0.295	0.023	12.896 (12.870)	<.001
6th year vs. 7th year	Fine motor	0.006	0.001	9.462 (8.233)	<.001
	Phoneme perception	0.007	0.001	7.264 (8.454)	<.001
	Pre-mathematics	0.282	0.018	15.820 (15.820)	<.001
	Relational reasoning	0.001	0.000	4.364 (4.671)	<.001
	Deductive reasoning	0.046	0.003	10.943 (9.842)	<.001
	Social skills	0.295	0.023	12.896 (12.040)	<.001
6th year vs. 8th year	Fine motor	0.006	0.001	9.462 (8.233)	<.001
	Phoneme perception	0.007	0.001	7.264 (8.454)	<.001
	Pre-mathematics	0.282	0.018	15.820 (15.820)	<.001
	Relational reasoning	0.001	0.000	4.364 (4.671)	<.01
	Deductive reasoning	0.046	0.003	10.943 (9.842)	<.001
	Social skills	0.295	0.023	12.896 (12.040)	<.001
7th year vs. 8th year	Fine motor	0.373	0.011	32.905 (8.233)	<.001
	Phoneme perception	0.302	0.009	33.452 (8.454)	<.001
	Pre-mathematics	0.282	0.018	15.820 (15.820)	<.001
	Relational reasoning	0.282	0.003	32.746 (4.671)	<.01
	Deductive reasoning	0.252	0.008	31.015 (9.842)	<.05
	Social skills	0.295	0.023	12.896 (12.040)	<.001

DISCUSSION

To address the existing research gap regarding the evaluation of the psychometric properties of the DIFER assessment for Hungarian children in Slovakia and Hungary, this study aimed to investigate three specific research questions. By doing so, we planned to contribute to the understanding of the measurement qualities of the DIFER assessment and bridge the research gap in this area.

The first research question was to investigate the alignment between students' abilities and the difficulty levels of items in the DIFER school readiness assessment. According to the item-response theory, it is also

important to measure the relationship between items and students' ability (Liu et al., 2022; Polat, 2022). Therefore, to answer this question, we conducted a thorough analysis of the item-person parameters using Rasch analysis. This analysis enabled us to examine the relationship between students' abilities and the difficulty levels of the test items, shedding light on the alignment between the two. The item-person maps presented in our findings provided a visual representation of this alignment, showing that students generally performed well on items of moderate difficulty. This observation suggests that the DIFER test effectively captures students' abilities across a range of skill levels, allowing for a comprehensive assessment of school readiness. However, within the dichotomous test, we identified 5 items (out of 137 items) that emerged as particularly easy based on their low item discrimination scales. These items exhibited a limited ability to differentiate between students of varying ability levels within the construct being measured by the DIFER test. To ensure the construct validity of the assessment, we made a decision to exclude these items from further analyses. By doing so, we improved the sensitivity and accuracy of the DIFER test in assessing school readiness. This aligns with some studies that removed some items for their test accuracy (Veas et al., 2017; Yan & Mok, 2012; Ziv, 2013).

After removing the psychometric items, a comprehensive multidimensional Rasch analysis was conducted to examine the item-person parameters associated with the DIFER school readiness test. The validity of the item and person fit was evaluated using the recommended MNSQ for infit/outfit measures, which fell within the acceptable range. The satisfactory item separation analysis indicated that all domains of the DIFER test encompassed a range of items spanning different levels of difficulty, confirming the content validity of the assessment. The examination of unidimensionality and local independence also suggested to us that the DIFER test effectively assessed the relevant dimensions of school readiness (Soeharto & Csapó, 2022). Hence, by addressing the first research question, we gained valuable insights into the difficulty levels of the DIFER assessment items, enabling us to make appropriate adjustments based on students' ability levels for a more accurate and tailored school readiness assessment.

The second research question is to examine the reliability and validity of the DIFER school readiness assessment, using the perspective of the classical test

theory as proposed by Haw et al. (2022). This examination of the psychometric properties of the DIFER test provides crucial insights into the assessment's reliability and validity, which are fundamental aspects of any robust measurement tool. In order to evaluate the reliability of the DIFER test, several statistical measures were employed using IBM SPSS Statistics 23.0. Internal consistency, a commonly used indicator of reliability, was assessed through the estimation of Cronbach's alpha and composite reliability (CR). The results indicated that the internal consistency reliability of all dimensions of the DIFER test exceeded the widely accepted threshold of 0.70. Additionally, the CR values for all dimensions surpassed the threshold of 0.70, further supporting the overall reliability of the DIFER test. This finding is also consistent with other school readiness assessments (Amukune et al., 2022a; Csapó et al., 2014; Józsa et al., 2022a), encompassing the internal consistency reliability of all dimensions of the DIFER test. In the reliability measure of the DIFER test, the high Cronbach's alphas can potentially indicate item redundancies and narrow item construction. However, in the context of our DIFER test, we completely understand the significance of maintaining a balanced and diverse set of items that accurately assess the range of skills related to school readiness. Furthermore, the DIFER test is a criterion-referenced test in Hungary. Therefore, we could not delete many items. However, researchers in the future have the flexibility to adapt and verify the suitability of the DIFER school readiness test according to their particular circumstances.

To assess the construct validity of the DIFER test, a confirmatory factor analysis (CFA) was conducted using SmartPLS4. The results demonstrated a good fit between the hypothesized model and the observed data, as indicated by non-significant chi-square values, positive degrees of freedom, and favorable fit indices such as SRMR, CFI, and RMSEA. These fit indices, which align with Kline's (2015) recommendations, provided evidence of a strong model fit for both the dichotomous and rating versions of the DIFER school readiness assessment. Further analysis of the CFA models revealed good item-factor correlation coefficients, indicating close relationships between the items and the underlying factors of both the dichotomous and rating tests. This finding supports the development of robust constructs for both tests by CFA measures (Diotaiuti et al., 2022; Liu et al., 2020). Consequently, it can be inferred that the DIFER test successfully captures the multidimensional nature of school

readiness, lending further support to its construct validity. The construct validity of the DIFER test was further assessed through an examination of convergent validity and discriminant validity. The findings indicate that the DIFER test exhibits strong construct validity, aligning with established criteria for convergent and discriminant validity assessments (Russo et al., 2019).

In accordance with the theory of SEM, the third research question was aimed at investigating potential variations in performance on the DIFER test based on factors such as countries, genders, and ages. The measurement invariance of the DIFER test was examined across different groups, and separate analyses were conducted for the dichotomous test and rating test components. Initially, the measurement invariance of the dichotomous test model was assessed within each group, but the results indicated unsatisfactory fit indices. By addressing the measurement errors through the introduction of correlations, improvement was observed in the model fit for all dimensions of both the dichotomous and rating tests, aligning with findings from the previous studies (Calchei et al., 2023; Zewude & Hercz, 2022). Measurement invariance was then examined across countries, genders, and the ages of 4th, 5th, 6th, 7th, and 8th years. The findings from the measurement invariance analyses provide valuable insights into the performance variations on the DIFER test based on country, gender, and age. The established measurement invariance across countries suggests that the test is valid and reliable for assessing school readiness (based on fine motor, phoneme perception, pre-mathematics, relational reasoning, deductive reasoning, and social skills) in both Slovakia and Hungary.

Similarly, the measurement invariance across genders supports the use of the DIFER test as a fair assessment tool for both boys and girls. However, it is important to note that partial invariance was observed across age groups, specifically related to item74. This may be the reason that this item was somehow easy for assessing different age groups of students from both countries. Therefore, researchers from some studies (Kline, 2015; Macy et al., 2021; Soeharto & Csapó, 2022) suggested that huge number of participants and their different ages can also cause invariance in all types of assessments. This finding suggests that the interpretation of the test results should consider the potential influence of age on certain aspects of school readiness, particularly pre-mathematics skills.

Moreover, the results regarding latent mean differences in the DIFER test provide valuable insights into the variations observed across countries, genders, and age groups (Csapó et al., 2014; Józsa et al., 2017). In terms of country comparisons, Hungarian students who live in Hungary exhibited notable superiority in fine motor skills and social skills compared to those who live in Slovakia. When examining gender differences, male students demonstrated a significant advantage in fine motor skills and deductive reasoning compared to their female counterparts. However, no substantial disparities were found in the remaining skills. Exploring different age groups revealed a clear progression in latent abilities as children advanced in age (Anthony et al., 2022). Higher age groups (6th, 7th, and 8th years) exhibited superior latent abilities, particularly in areas such as pre-mathematics skills. Overall, these findings highlight the nuanced variations in latent abilities across countries, genders, and age groups, providing valuable insights into the diverse developmental trajectories of young children. It underscores the importance of considering multiple factors (fine motor skills, phoneme perception, pre-mathematics skills, relational reasoning, deductive reasoning, and social skills) when assessing school readiness and emphasizes the need for tailored educational approaches that accommodate individual strengths and developmental trajectories (Józsa et al., 2022a).

In the DIF analysis, our exploration into how the test items functioned across distinct age groups shows intriguing disparities. Notably, the DIF logits exhibited a significant range between the 4th-year and 8th-year age groups. These observations underscore that the cognitive demands of certain items are influenced by age, implying an intricate interplay between cognitive maturation and item performance. This insight aligns with the prevailing theoretical considerations regarding the developmental trajectory of general cognitive ability (g) and its potential evolution across childhood (Demetriou et al., 2020; Neumann et al., 2021). However, the MI analysis, which explored the equivalence of the measurement properties across the same age groups, presents a contrasting yet equally significant dimension. The robustness of our measurement model across various age groups is evident through the consistent fit of the configural, metric, and scalar models for both the dichotomous and rating tests. The reconciliation of these two results can be framed within the context of the developmental dynamics of the ‘g’ factor.

The DIF findings potentially reflect the evolving cognitive capabilities of children as they progress through different age groups, mirroring the theoretical anticipation of cognitive differentiation with age (Demetriou et al., 2020). On the other hand, the MI results indicate that while the overall measurement structure remains stable across ages, specific item behaviors may undergo slight variations. This interplay could be indictive of age-related cognitive shifts impacting the understanding and mastery of certain skills, such as pre-mathematics abilities. Further research is warranted to delve deeper into the nature of these age-related cognitive dynamics, considering the intricate interplay of 'g' and domain-specific cognitive abilities across developmental stages.

The study has some limitations. This study focuses on assessing school readiness during the DIFER test, but does not include other potential external factors that may influence readiness such as socioeconomic status, parental involvement, or early childhood education experiences. The findings of the research were interpreted within the context of the DIFER test and the population studied, and thus, applying the results to other populations should be considered in future research.

CONCLUSION

In conclusion, this study was conducted to investigate the psychometric properties of the DIFER school readiness assessment. The findings provide important insights into the alignment of students' abilities with the item levels in the DIFER test, the reliability and validity of the test, and the invariance in test performance based on countries, genders, and ages. The DIFER test effectively measured the intended constructs of school readiness, ensuring that the test items appropriately correspond to students' abilities. Moreover, the tests showed satisfactory levels of convergent validity and discriminant validity, as well as high values for AVE and CR, suggesting the suitability of the DIFER test for assessing school readiness. Moreover, the analysis of measurement invariance across countries, genders, and age groups revealed a lack of significant variance in the DIFER school readiness assessment, with the exception of a few differences in latent means.

Based on these findings, it is suggested that we further explore the factors that contribute to the observed latent mean differences in the DIFER school readiness assessment across countries, genders, and age groups. Additionally, conducting qualitative research or employing additional measures could provide deeper insights into the underlying reasons behind these variations. Further investigations into the contextual and cultural factors that may influence children's development and performance on the DIFER test could also be beneficial. This additional research can contribute to a more comprehensive understanding of the complexities involved in assessing school readiness and inform targeted interventions and support for children in different ways. The findings of this research contribute to our understanding of the complexity of the school readiness assessment and provide valuable insights for educational practitioners and policymakers in supporting children's developmental needs in such skills as fine motor, phoneme perception, pre-mathematics, relational reasoning, deductive reasoning, and social skills. The educators can utilize the DIFER test as a robust and valid tool for assessing children's school readiness. Furthermore, this study contributes to the growing body of literature on psychometric assessment in education, providing valuable guidance for practitioners seeking reliable and valid tools to assess children's readiness for formal education.

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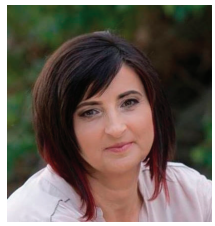

Discover the essential role of diagnostic assessment for school readiness with this comprehensive book. Exploring the landscape of pedagogical diagnostics, it examines the fundamental skills crucial for a child's successful transition to primary school. Through meticulous analysis, it uncovers the current state of diagnostic tools in Slovakia and Hungary, shedding light on the DIFER (Diagnostic Systems for Assessing Development) system for assessing the development of 4-8-year-olds. Comparative studies between Hungary and Slovakia offer valuable insights into educational programs and national curricula, highlighting significant differences and their potential impact on children's development. Furthermore, the book investigates the psychometric properties of the DIFER test, unveiling its reliability and validity in assessing school readiness across diverse demographics. Through the focus on kindergartens and primary schools with Hungarian as the language of instruction in Slovakia and Hungary, the book emphasizes the importance of providing the needs of linguistically diverse learners. By enhancing pedagogical diagnostics, the KEGA (Cultural and Education Grant Agency, Slovakia) project empowers children from diverse demographics, fostering inclusivity and support in educational settings. In summary, the book serves as a comprehensive resource that not only highlights key issues and challenges in school readiness assessment but also offers practical solutions and recommendations for improving educational practices and outcomes, both locally and globally.

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