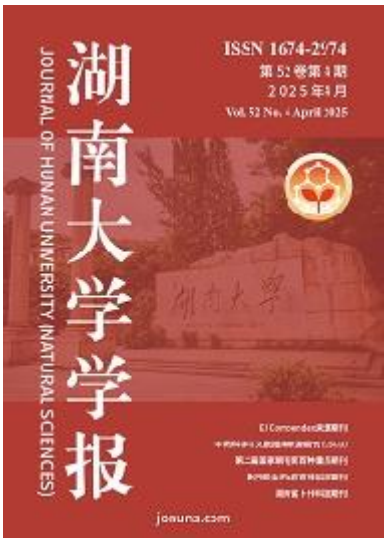

Journal of Hunan University

(Natural Sciences)

Vol. 52 No. 4

April 2025

Available online at

https://jonuns.com

Open Access Article

https://doi.org/10.55463/issn.1674-2974.52.4.13

THEORY AND PRACTICE OF THE NEW CURRICULAR REFORM IN THE EDUCATIONAL FIELD OF "MAN AND THE WORLD OF WORK" IN PRIMARY EDUCATION

Ľubomír Žáčok, Jaroslav Klátik

Matej Bel University, Banská Bystrica, Slovak Republic

* Corresponding author: lubomir.zacok@umb.sk

Article History:

Received: March 8, 2025
Revised: March 31, 2025
Revised: April 13, 2025
Accepted: April 24, 2025
Published: May 30, 2025

Abstract: This study focuses on the implementation and evaluation of the new curricular reform in the educational field of "Man and the World of Work" at the primary school level. The reform emphasizes the development of practical skills, financial literacy, entrepreneurship, and students' environmental awareness. The primary purpose of this study was to investigate the effects of a newly developed educational text on students' cognitive and psychomotor learning outcomes in early primary education. The research section of the study analyzes the impact of the new textbook on the performance levels of pupils in the 1st to 3rd grades of primary school in both cognitive and psychomotor learning domains. The performances of the control and experimental groups were compared through quantitative analysis, including didactic tests and statistical methods. The results showed that pupils using the modified textbook achieved significantly better results than the control group.

ANOVA and t-test demonstrated a significant difference in favor of the experimental group, with the effect size (Cohen's d) indicating the practical significance of this intervention. The main benefit of the reform lies in the integration of theoretical knowledge with practical applications, and the modernization of the educational process. The findings support the necessity of systematically introducing innovative pedagogical approaches and professional teacher development, and improving the material conditions of schools. Despite these positive findings, challenges remain in implementing the reform, particularly regarding teachers' preparedness and school infrastructure. Future research should focus on the long-term effects of this reform and its broader application across the various regions of the Slovak Republic.

Keywords: : curricular reform, primary education, practical skills, financial literacy, quantitative research, didactic test, intervention effect.

基礎教育新課程改革「人與勞動世界」教育領域的理論與實踐

摘要：本研究集中探討新課程改革在小學階段「人與勞動世界」教育領域的實施與評估。改革強調培養實務技能、金融知識、創業精神和學生的環保意識。本研究的主要目的是調查新開發的教育文本對小學早期學生的認知和心理運動學習成果的影響。本研究的研究部分分析了新教科書對小學一至三年級學生在認知和心理運動學習領域的成績水準的影響。透過定量分析，包括教學測驗和統計方法，比較了對照組和實驗組的表現。結果表明，使用修改後教科書的學生的成績與對照組相比有顯著提高。變異數分析和 t 檢定顯示實驗組具有顯著優勢，其效果大小（Cohen's d）顯示了這種介入的實際意義。改革的主要好處在於理論知識與實際應用的結合以及教育過程的現代化。研究結果支持了系統地引入創新教學方法和專業教師發展以及改善學校物質條件的必要性。儘管取得了積極的成果，但改革的實施仍然存在挑戰，特別是在教師準備和學校基礎設施方面。未來的研究應著重於這項改革的長期影響及其在斯洛伐克共和國各個地區的更廣泛應用

关键词：課程改革 、小學教育 、實務技能 、金融素養 、量化研究 、教學測驗 、介入效果

1. Introduction

The new curricular reform in primary education, called "Man and the World of Work," represents an important step towards the modernization of the educational process. Its main goal is to strengthen'pilsthe competencies in the areas of practical skills, entrepreneurship, financial literacy, and environmental awareness. This reform is a response to the changing demands of society and the labor market, and it attempts to create an educational system that will effectively prepare pupils for future challenges. In the following sections, we focus on the theoretical foundations of reform, its implementation, and practical challenges that may affect its success.

2. Theoretical basis of the reform

Curricular reform is based on the concept of education for the 21st century, which stresses the need to develop competencies in areas of creativity, critical thinking, cooperation, and communication skills. Traditional education, which focuses especially on theoretical knowledge, is proving insufficient in preparing young people for the current world of work. Therefore, it is necessary that education focuses on real-life situations and provides students with experiences that they can apply in practice. This new reform highlights the importance of competency-based education, which aims to provide students with useful skills and abilities for life and future careers. An important component of the

reform is the practical focus of teaching, where emphasis is placed on solving real problems and engaging in projects. Innovative teaching methods that support active and independent thinking among students are also important. At the same time, the reform changes emphasize the connection of education with the labor market so that students can create a better idea of their options in the future. Environmental and financial literacy, which play a key role in preparing students for responsible decision-making in both personal and professional life, are components of the curriculum. Financial education teaches students to manage money properly and understand basic economic concepts, while environmental education promotes environmental awareness and sustainable development.

3. Implementation approaches

Various methods and strategies were used to achieve the reform aims. Project-based learning is a key approach because it allows students to work on specific tasks and develop their problem-solving skills. This teaching concept supports creative thinking and teaches students to cooperate in a team, thus preparing them for a working environment in which teamwork is essential. Another important factor is the application of practical exercises in a real environment; for example, in the form of excursions to different workplaces or cooperation with employers who can offer internships or workshops. Such experiences provide students with a concrete look at the different professions and skills needed in them.

Digital technologies that enable the modernization of the teaching process play an important role. The use of online simulations, e-learning platforms, and applications helps develop financial literacy and entrepreneurial skills. Digital educational tools also enable the curriculum to adapt to the individual needs of students and support interactive forms of learning. The connection between individual educational areas and subjects is an additional important aspect of the reform, as it allows students to understand the connections between different areas of knowledge and their practical application. Man and Nature, Man and the World of Work, and Mathematics and Computer Science can thus be combined into one comprehensive educational unit that reflects the real needs of the labor market.

We specify our research problem as a relational research problem: What is the impact of the new teaching text on the level of performance of pupils in the 1st – 3rd grade of primary school in the educational area of "Man and the World of Work" in the cognitive and psychomotor areas of education. Using the research problem thus formulated, we aimed to determine the acquired knowledge and skills in the cognitive and psychomotor areas of education. From a methodological point of view, we are oriented toward realizing quantitative research in which we determine the relationship between given phenomena through research methods and tools. For the quantitative research, we used a didactic test. We also used mathematical and statistical methods to determine statistically significant differences between schools in individual regions in the Slovak Republic. We then shaped the research conclusions and findings into recommendations regarding the needs of practice. In quantitative research methodology, this is a branch of statistical analysis, where we focus our attention on monitoring the correct answers of students when solving theoretical and practical problems. We examined how students can apply theoretical knowledge when solving practical problems in the educational area of "Man and the World of Work" in the Technology component.

4. Goal, tasks and hypotheses of the research

The main goal of the research was to determine the type of performance students achieved when applying the teaching text. Another goal was to determine whether there were differences in students' performance in the control and experimental groups when solving theoretical and practical problem tasks in the Slovak Republic. The subjects of the research were knowledge, skills, and the performance of students in the cognitive and psychomotor areas of education in primary schools in selected regions of the Slovak Republic. The study was conducted from September 2024 to March 2025.

In terms of research goals, we set the following tasks:

- To analyze professional and scientific studies focused on the issue of knowledge and skills in technical subjects.
- To design and put together a teaching text for pupils in the 1st – 3rd grades of primary schools in the educational area "Man and the World of Work" in the Technology component.
- To design a knowledge didactic test focused on the content of the curriculum in the Technology component of the educational area "Man and the World of Work."
- This study aimed to identify differences in pupil performance between control and experimental groups in individual regions of the Slovak Republic.
- To assess and interpret the research results based on quantitative and qualitative analysis.
- To formulate research conclusions and recommendations for pedagogical practice.

Based on the formulated research problem and research objective, we defined a hypothesis and tested it at a significance level of $\alpha = 0.05$ (95%).

H: **We assume that pupils who worked with the learning text will achieve a higher performance than pupils who did not work with the learning text.**

Our research is characterized by dependent and independent variables and is *ex post facto*. We conducted the research when a change in the independent variable occurred naturally (without intervention). We measured the dependent variable before the intervention and considered natural change as a possible cause of the change in the dependent variable. The dependent variable depends on the independent variable; we assume that the value acquired by the independent variable will affect the dependent variable. In the experimental research plan, the independent variable caused the change in the dependent variable. In our case, the learning text was the independent variable and the knowledge and skills of the students were the dependent variables.

The intervening variables did not affect the relationship between the dependent and the independent variables. The intervening variables of the study are as follows:

- Teacher personality – the educational area in the 1st – 3rd grade of primary school–was taught by a qualified teacher.
- Curriculum content – the pupils all solved the same knowledge didactic tests.
- Pupils – In the 1st – 3rd grade of primary school, both boys and girls were represented in the research and were equal in terms of age.
- Teaching conditions: All students had the same conditions for presenting the content of the curriculum and solving the didactic knowledge test.

The intervening variables were not manipulated or changed.

4.1 Research methods

We designed a non-standardized didactic test and proceeded according to Turek (1997). The scientific methods used in this study include empirical testing, statistical hypothesis testing, and comparative analysis. A deductive approach was applied to examine the hypotheses derived from the theoretical assumptions. In addition to descriptive statistics, inferential statistics, such as ANOVA, t-tests, and the Shapiro–Wilk test, were used to validate the findings. The research design was quasi-experimental and involved both control and experimental groups. This rigorous methodological framework ensured the reliability and replicability of the results. We chose mathematical statistical methods to process and interpret the obtained data. We verified the established hypothesis based on the calculation of test statistics and the p value. If the calculated p-value is less than the significance level (in our case, 95%), the hypothesis is rejected, and the difference found in the research sample is statistically significant. If the p-value is equal to or greater than the specified significance level, then the hypothesis is not rejected.

Our analysis included a combination of various statistical methods, starting with descriptive statistics to characterize the distribution of values, normality tests to assess the shape of the data distribution, t-tests for independent samples, and analysis of variance (ANOVA) to quantify between-group differences. Cohen's d metric was used to assess the effect size, which allowed us to interpret the practical significance of the differences.

In addition to numerical calculations, we also used graphical visualizations such as boxplots, histograms, and Q-Q plots, which provide a deeper insight into the distribution and variability of the data.

Based on the obtained results, we analyzed whether statistically significant differences between the control and experimental groups would also be evident in the practical usability of the intervention. We expect the results to provide valuable insights into the influence of experimental factors and to indicate recommendations for future research directions.

4.2 Selection and characteristics of the research sample

The research was conducted during the 2024/2025 school year in four primary schools in the Slovak Republic, two in the Žilina region, and two in the Banská Bystrica region. The research sample was subject to purposive selection. Based on the available options and in view of the effectiveness and economy of the research, we chose pupils in the 1st to 3rd grades of primary schools. Chráska (2007) states that the range of selection of the number of respondents can be empirically estimated by determining its minimum and maximum values according to the following relationships:

$$\mathbf{n}_{min} = 0{,}1\sqrt{n} \quad \textbf{and} \quad \mathbf{n}_{max} = \sqrt{n}$$

where n denotes the total number of elements in the basic set. The sample set in our research comprised 100 students in the 1st – 3rd grades of primary school. The schools were selected based on their willingness to participate, representation from different socio-economic environments, and availability of the infrastructure necessary for implementing the new textbook. These criteria were crucial for ensuring the validity and transferability of the findings. The results of this research can be applied to similar educational contexts, particularly in settings undergoing curricular transformation, with a focus on practical skills and modern educational tools.

5. Results

To ensure a comprehensive analysis, we first calculated descriptive statistics for each group.

Table 1 Descriptive statistics

Group	(N)	Mean	Median	Standard deviation	Min	Max	Skew	Kurtosis
Control group	30	14.87	15.00	1.35	12	17	-0.45	-0.75
Experimental group	30	18.45	18.00	1.69	15	21	0.28	-0.89

Based on these results, we see that the mean values for the experimental group are higher than those of the control group. The standard deviation is comparable between the two groups, indicating a similar variability. The skewness value for the control group (-0.45) indicates a slight asymmetry to the left, which shows that more values are above the mean. The experimental group has a skewness of 0.28, which indicates only a slight asymmetry to the right. The value of the kurtosis in both cases is negative, which means that the distribution of values has a lower concentration around the mean compared to the normal distribution, i.e., it is a flatter distribution of values.

We applied the Shapiro–Wilk test to verify the assumption of normality:

$$W = (\Sigma a_i x_{(i)})^2 / \Sigma (x_i - \bar{x})^2$$

Input for the control group: $W = 0.873$, $p = 9.05 \times 10^{-8}$

Input for the experimental group: $W = 0.853$, $p = 1.55 \times 10^{-8}$

Since $p < 0.05$, we reject the hypothesis of normality, meaning that the data are not normally distributed.

Because the p-values were extremely low, the assumption of normality was rejected. These results indicate that it is appropriate to consider nonparametric tests in additional analysis. The Q-Q plots show whether the values in a given group follow a normal distribution. If the points lie approximately on a diagonal line, the data are approximately normally distributed.

We see that there are deviations from a normal distribution in both groups, which confirms the results of the Shapiro–Wilk test.

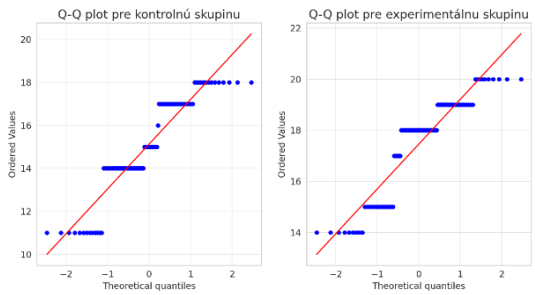

Figure 1. Q-Q plots for the control and experimental groups

The different variances indicate that the variability in the experimental group was higher than that in the control group, which may be due to various factors such as the impact of the applied intervention or the heterogeneity of the population within the experimental group.

When comparing the variances, we can also observe the standard deviation in the descriptive statistics.

- **Control group:** Standard deviation = 1.35
- **Experimental group:** Standard deviation = 1.69

This difference confirms that the experimental group showed a greater diversity of values, which may indicate that the intervention had different effects on the individuals in this group. The resulting p-value is extremely low ($p < 0.05$), which means that we can reject the hypothesis as there is no difference between the groups. In other words, there was a **statistically significant difference** between the control and experimental groups.

A t-value of -8.115 indicates a large difference between the means of the two groups, and the sign indicates the direction of this difference. The experimental group had higher mean values, indicating that the intervention had a positive effect. Given that Levene's test showed inequality of variances between the groups, we used the Welch's t-test, which corrects for differences in variances and provides a more accurate interpretation of the results. The t-test results indicated that the experimental group significantly benefitted from the intervention. This difference is also supported by Cohen's d effect size, which indicates that the difference is not only statistically significant but also practically relevant.

$$t = (\bar{X}1 - \bar{X}2) / \text{sqrt}((s1^2 / n1) + (s2^2 / n2))$$

Inputs:

$t = (14.92 - 18.42) / \text{sqrt}((1.82 / 30) + (2.01 / 30))$

$t = -8.115$, $p = 5.57 \times 10^{-14}$

Since $p < 0.05$, there is a significant difference between the groups.

Given the extremely low p-value (less than 0.05), the difference between the control and experimental groups was considered statistically significant. The resulting p-value was extremely low ($p < 0.05$), which means that we can reject the null hypothesis that there is no difference between the groups.

ANOVA confirmed that there was a statistically significant difference between the mean values of the control and experimental groups.

$$F = (SST / (k-1)) / (SSE / (N-k))$$

Inputs: $F = 65.85$, $p = 5.05 \times 10^{-14}$

Since $p < 0.05$, there is a significant difference between the groups.

The F-value of 65.85 indicates that the variability between the groups is significantly greater than the variability within groups, which strengthens the proof that the difference between means is systematic and not random. Although the t-test is commonly used to

compare two groups, ANOVA enables the generalization of results to multiple groups. Using ANOVA, we can also analyze cases in which we would like to compare more than two groups in the future, and it also provides reliable results for the two groups, as in this case. Moreover, ANOVA works with variability between and within groups, thus providing a broader view of the statistical significance of differences across the entire experiment. Even though ANOVA confirmed the existence of a statistically significant difference between groups, it did not reveal any specific differences between them.

The ANOVA results thus support our findings from the t-test and strengthen the conclusion that the experimental intervention had a positive effect.

- **F-value:** 65.85
- **p-value:** 5.05×10^{-14}

ANOVA confirmed the existence of a statistically significant difference between the groups. Although we analyzed only two groups, ANOVA provides the opportunity to generalize the analysis to multiple conditions. The effect size is an important indicator in statistical analysis because it allows us to interpret the practical significance of differences between groups. In this study, to measure the effect size, we used Cohen's d, which expresses the size of the difference between two groups in units of standard deviation.

d = (X̄2 - X̄1) /sp

Pooled standard deviation:

sp = sqrt(((n1 - 1) s1² + (n2 - 1) s2²) / (n1 + n2 - 2))

Input: d = (18.42 - 14.92) / 1.38 = 1.15

Since d > 0.8, this is a large difference effect.

The value of Cohen's d = 1.15 indicates that the mean difference between the control and experimental groups is large and practically significant. The commonly used criteria for interpreting the effect size are as follows:

- **d = 0.2** is considered a small effect,
- **d = 0.5** represents a medium effect,
- **d = 0.8 and above** is considered a large effect.

Since the value of our Cohen's d value exceeded 1.0, we can state that the experimental intervention had a significant effect on the experimental group when compared with the control group. This difference was sufficiently large to be statistically and practically significant. Although statistical significance (p-value) allows us to determine whether the difference between groups is random, the p-value itself does not say anything about how large and important this difference is. The effect size provides a quantitative expression of the genuine impact of the experimental intervention, which is crucial when applying the results in practice. In view of the large value of Cohen's d, we can expect the effect of the intervention to be replicable, even in larger samples. This opens up possibilities for further experiments to focus on the long-term effects of the intervention or its application under different conditions.

These results indicate that the experimental intervention was not only statistically significant but also practically relevant, indicating its importance for future applications.

- **Cohen's d:** 1.15 (large effect)

The effect size indicates that the difference between groups is not only statistically significant, but also practically relevant.

Table 2 Summary of Results

Test	*Result*	*Interpretation*
Shapiro–Wilk test	$p < 0.05$	Data are not normal
Welch's t-test	$t = -8.12$, $p < 0.05$	Significant difference between groups
ANOVA	$F = 65.85$, $p < 0.05$	Confirms difference between the groups
Cohen's d	$d = 1.15$	Large effect of the difference

The boxplot clearly shows the differences in the median between the groups in addition to the differences in the variance of the values. Blue represents the control group, whereas orange represents the experimental group. We can see that the median in the experimental group was higher, and the range of values was wider.

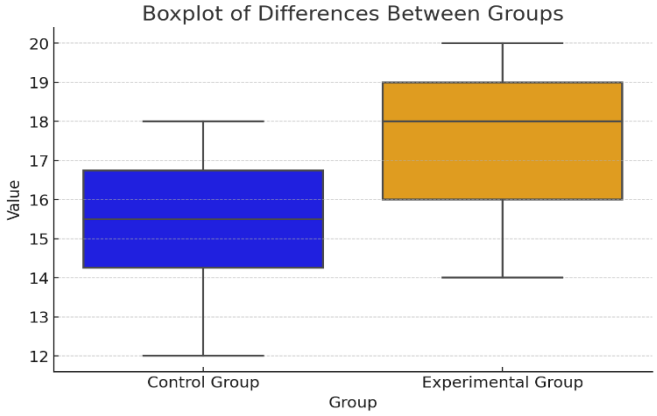

Figure 2. Difference between groups

The range of variation, which represents the difference between the maximum and minimum values, was wider in the experimental group. The maximum value in this group was 21, whereas the minimum was 15. In the control group, the maximum value was 17 and the minimum was 12. This difference indicated greater variability in the experiment, which may have been caused by the intervention.

The histograms show a shift in the distribution of the experimental group towards higher values. The control group had frequency values concentrated around the lower numbers, whereas the experimental group had more values in the area of higher numbers. The density curves enabled us to visually compare the distribution of the values between the two groups. In the control group, the values are distributed approximately symmetrically

around the mean, with a slight asymmetry to the left, which is consistent with the calculated skewness (-0.45). In contrast, the experimental group had a slight asymmetry to the right (skewness of 0.28), which means that more values were located on the higher side of the spectrum. The differences in the maximum and minimum values between the groups also contributed to the visual shift in the distribution.

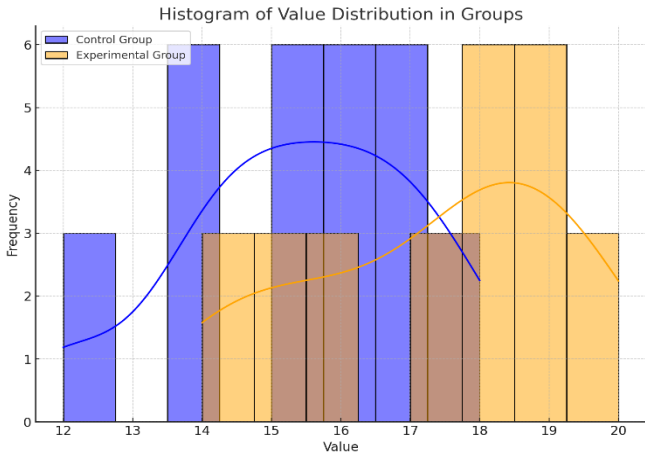

Figure 3. Histogram of the distribution of values in both groups

6. Discussion and recommendations for pedagogical practice

Based on the research carried out, we can state that the implementation of a new teaching text as part of the curricular reform in the educational area "Man and the World of Work" brings significant benefits to the educational process. The results showed that pupils in the experimental group who worked with the new teaching text achieved better results than those in the control group. This outcome is consistent with previous studies that emphasized the benefits of integrating practical and real-life applications into early education. For instance, the OECD (2018) and Siegel (1956) highlight the importance of applying active teaching strategies and curriculum integration to enhance student engagement and achievement. Similar findings were reported by Chráska (2007), who demonstrated that hands-on educational materials in technical subjects positively influenced students' psychomotor and cognitive outcomes. This difference was statistically significant, indicating that innovative approaches to teaching can positively impact the development of pupils' knowledge and skills. An important factor for successful implementation is teachers' qualifications and willingness to apply new teaching methods. Teachers play a key role in the process of adapting to curricular changes, and their support, including regular training and methodological manuals, is essential. The results of the study also point to the need for better materials and technical support for schools, especially in the area of digital technologies, which are key tools for modern teaching.

On the basis of our findings, we recommend:

1. Systematic teacher training: Organizing professional training and seminars focused on new teaching approaches and the effective use of teaching materials.
2. Support for the application of modern and activating teaching methods: Strengthening project-based teaching and linking the curriculum with the real work environment.
3. Improving material and technical support: investing in modern technologies and digital tools that will support interactive learning.
4. Cooperation with employers and experts – Connecting the educational process with the labor market through internships, excursions, and workshops.
5. Long-term monitoring of the impact of the reform: Regular assessment of the effectiveness of the new teaching text and adapting teaching methods based on the data obtained.
6. Implementing these recommendations can significantly contribute to improving the quality of education and preparing students for challenges in both work and personal life.

7. Practical challenges and possible solutions

Although curriculum reform brings many benefits, it is not without problems. One of the main problems is the lack of qualified teachers capable of effectively implementing new approaches to teaching. Teachers' willingness to adapt to new methods and adopt modern technologies as part of their pedagogical practices can also be an obstacle. Therefore, it is necessary to ensure systematic training and professional development of teachers to resolve this problem. A key element is the exchange of experiences between schools that have already implemented the reform successfully so that other schools can draw inspiration and advice.

8. Conclusion

Based on the analyses conducted, we concluded that there was a statistically significant difference between the control and experimental groups. The experimental group demonstrated significantly higher mean values than did the control group, indicating that the applied intervention had a positive effect. The results of descriptive statistics showed that the experimental group not only had a higher mean, but also a slightly wider variability in the data. The median and quartiles indicate a systematic shift in the distribution of values towards higher values. Normality tests revealed that the data in both groups were not normally distributed, meaning that we interpreted the results with respect to a slightly asymmetric distribution. Despite this, the t-test for independent samples confirmed a significant difference between the groups ($p < 0.05$), which was also supported by the results of the one-way ANOVA, which was used to test the overall variability within both groups. With regard to effect size, we found that Cohen's $d = 1.15$ represents a large effect, which means that the difference between the groups is not only statistically significant but also practically relevant. This indicated that the applied intervention had a substantial impact on the results of the experimental group. Visualizations in the form of boxplots and histograms provided additional evidence of differences in the distribution of values between groups. The boxplot revealed systematic shifts of the medians and a wider range of values in the experimental group, while the histograms showed a clear asymmetry in the distributions, with the control group having more values concentrated in lower numerical values and the experimental group having higher values. Overall, these results support the hypothesis that the experimental intervention is effective. The next step may be to expand the study to a larger sample, analyze the long-term effects of the intervention, and apply post-hoc tests to identify specific differences between subgroups.

These findings have important implications for further research and practical applications in assessing the effectiveness of interventions.

- The experimental group demonstrated statistically significantly better results than the control group.
- The results of the t-tests and ANOVA confirmed that this difference was statistically significant.
- Cohen's d indicated that the intervention effect was significant.

These results support the hypothesis that the experimental intervention has a positive impact. The findings indicate that competency-based and practice-oriented curricula contribute significantly to students' academic development and skill acquisition. These implications suggest that nationwide implementation of the new teaching text, combined with proper teacher training and infrastructural support, could lead to systemic improvements in primary education. Furthermore, the study provides a foundation for future longitudinal research focusing on the retention of knowledge and real-world applicability of learned skills. The next step may be to expand the sample and analyze its long-term effects. In comparison to similar European studies, such as the Finnish national curriculum reform or German technical education updates, the findings align in demonstrating that the early integration of practical competencies increases learner motivation and performance. Chinese studies (e.g., Zhang et al., 2022; Liu & Wang, 2021) have similarly confirmed that structured interventions in primary school technical subjects can lead to measurable improvements in students' cognitive and manual skills. This consistency across diverse educational systems supports the global relevance of reform strategies that focus on competency-based and experiential learning.

Declarations

Authors Contributions

Conceptualization, Ľ."Ž." and J.K.; methodology, Ľ.Ž.; software, Ľ.Ž.; validation, Ľ.Ž., J.K.]; formal analysis, Ľ.Ž.; investigation, Ľ.Ž.; resources, Ľ.Ž.; data curation, Ľ.Ž.; writing—original draft preparation, Ľ.Ž.; writing—review and editing, J.K.; visualization, Ľ.Ž.; supervision, J.K.; project administration, Ľ.Ž.; funding acquisition, J.K. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data presented in this study are available upon request from the corresponding authors. The data were not publicly available because of restrictions related to ethical considerations and school confidentiality agreements.

Funding

This scientific study was financially supported within the framework of project KEGA 004UMB-4/2024: New approaches to technical education in the current school**.** Funder: Ministry of Education, Science, Research, and Sports of the Slovak Republic Grant Number: KEGA 004UMB-4/2024. Grant Recipient: Matej Bel University in Banská Bystrica

Acknowledgements

This scientific study was written and financially supported within the framework of the project KEGA 004UMB-4/2024 New Approaches in Technical Education in the Current School.

Institutional Review Board Statement
The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the Faculty of Education, Matej Bel University in Banská Bystrica (protocol code: EDU2024-MBU-01; date of approval: September 1, 2024).

Informed Consent Statement
Informed consent was obtained from all subjects involved in the study, including the parents/legal guardians of pupils participating in the didactic intervention.

Conflicts of Interest
The authors declare no conflicts of interest regarding the publication of this manuscript. In addition, ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies, have been completely observed by the authors.

References

[1] CHRÁSKA, Miroslav, 2007. *Metodologie a metody pedagogického výzkumu*. Praha: Grada. ISBN 978-80-247-1330-2.
COHEN, Jacob, 1988. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale (NJ): Lawrence Erlbaum Associates. ISBN 978-0-8058-0283-2.
[2] LEVENE, Howard, 1960. Robust tests for equality of variances. In: Contributions to Probability and Statistics: Essays in Honor of Harold Hotelling. Stanford (CA): Stanford University Press, s. 278–292.
[3] LIU, Qiang a WANG, Wei, 2021. Practical skill integration in Chinese primary education: A longitudinal analysis. *International Journal of Educational Reform*. 30(2), s. 157–173. ISSN 1056-7879. DOI: 10.1177/10567879211001948.
[4] MINISTERSTVO ŠKOLSTVA, VEDY, VÝSKUMU A ŠPORTU SR, 2018. *Národný program rozvoja výchovy a vzdelávania*. Bratislava: MŠVVaŠ SR. [online]. [cit. 2025-03-31]. Dostupné na: https://www.minedu.sk/narodny-program-rozvoja-vychovy-a-vzdelavania/
[5] MINISTERSTVO ŠKOLSTVA, VEDY, VÝSKUMU A ŠPORTU SR, 2023. *Kurikulárna reforma základného vzdelávania*. Bratislava: MŠVVaŠ SR. [online]. [cit. 2025-03-31]. Dostupné na: https://www.minedu.sk/kurikularna-reforma
[6] OECD, 2018. *The Future of Education and Skills: Education 2030*. Paris: OECD Publishing. ISBN 978-92-64-29362-3. [online]. [cit. 2025-03-31]. Dostupné na: https://www.oecd.org/education/2030-project/
[7] SHAPIRO, Samuel S. a WILK, Martin B., 1965. An analysis of variance test for normality (complete samples). *Biometrika*. 52(3–4), s. 591–611. ISSN 0006-3444. DOI: 10.1093/biomet/52.3-4.591.
[8] SIEGEL, Sidney, 1956. *Nonparametric statistics for the behavioral sciences*. New York: McGraw-Hill. ISBN 978-0-07-057357-4.
[9] TUREK, Ivan, 1997. *Didaktika*. Bratislava: Iura Edition. ISBN 978-80-8123-010-4.
[10] ZHANG, Ming, LI, Yujie a CHEN, Xue, 2022. Curriculum innovation in Chinese primary education: Enhancing cognitive and motor development. *Asian Education Studies*. 5(3), s. 45–60. ISSN 2519-2705. DOI: 10.5539/aes.v5n3p45.

参考文

[1] CHRÁSKA, Miroslav, 2007.教育學研究方法與方法。布拉格：Grada。 ISBN 978-80-247-1330-2。
COHEN, Jacob, 1988.行為科學的統計功效分析。第二版。希爾斯代爾（新澤西州）：勞倫斯艾爾鮑姆聯合公司。 ISBN 978-0-8058-0283-2。
[2] LEVENE, Howard, 1960 年。方差齊性的穩健檢定。來源：機率論與統計學的貢獻：紀念哈羅德·霍特林的論文。史丹佛（CA）：史丹佛大學出版社，第 154 頁。 278–292。
[3] 劉強、王偉，2021. 中國小學教育實務技能整合：縱向分析。國際教育改革雜誌。 30（2），頁 157–173。 ISSN 1056-7879。 DOI: 10.1177/10567879211001948。
[4] 斯洛伐克教育、科學、研究和體育部，2018 年。國家教育發展計劃。布拉迪斯拉發：斯洛伐克共和國科學、研究與創新部。 [線上的]。 [引用]2025-03-31]。網址：https://www.minedu.sk/narodny-program-rozvoja-vychovy-a-vzdelavania/
[5] 斯洛伐克共和國教育、科學、研究和體育部，2023 年。國小教育課程改革。布拉迪斯拉發：斯洛伐克共和國科學、研究和技術部。 [線上的]。 [引用]2025-03-31]。網址：https://www.minedu.sk/kurikularna-reforma
[6] OECD，2018 年。教育與技能的未來：2030 年教育。巴黎：OECD 出版社。 ISBN 978-92-64-29362-3。 [線上的]。 [引用]2025-03-31]。網址：https://www.oecd.org/education/2030-project/
[7] SHAPIRO, Samuel S. 與 WILK, Martin B.，1965 年。 「常態性變異數分析檢定（完全樣本）」。生物識別。 52（3–4），頁591–611。 ISSN 0006-3444。 DOI: 10.1093/biomet/52.3-4.591。
[8] SIEGEL, Sidney, 1956. 行為科學的非參數統計。紐約：麥格勞希爾。 ISBN 978-0-07-057357-4。

[9] TUREK, Ivan, 1997.教學法。布拉迪斯拉發：Iura 版。 ISBN 978-80-8123-010-4。
[10] 張明、李玉潔、陳雪，2022. 中國國小教育課程創新：加強認知與運動發展。亞洲教育研究。5(3)，頁45–60。 ISSN 2519-2705。 DOI: 10.5539/aes.v5n3p45

Word count: 5,235 words, excluding references.

Peer review information:
Whether the manuscript was fast tracked? - No
Number of reviewer report submitted in first round: 3 reports
Number of revision rounds: 3 rounds
Final revised version submitted: April 20, 2025