

METHODOLOGY FOR TEACHING VIRTUAL WRITTEN ENGLISH COMMUNICATION IN SECONDARY SCHOOLS: A STATISTICAL EVALUATION OF EFFECTIVENESS

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Oksana Boiko, Postgraduate Student of the Foreign Language and
Linguodidactics Department, Faculty of English Philology,
Zaporizhzhia National University

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The meta-analysis of evolutionary trends in pedagogical linguistics and the intensification of technocentric adaptation within educational environments necessitates re-evaluating methodological approaches to cultivating virtual discursive competences in English-language writing. The integrative synthesis of cognitive-discursive paradigms with pragmalinguistic concepts provides a foundational platform for constructively implementing multimodal textual practices. Deeply embedded correlational relationships between interactive text creation frequency and cognitive lexico-syntactic adaptability illustrate the complexity of the polyfactorial influences on the emergent properties of cohesive and coherent textual constructs. An empirical approach to the statistical verification of methodological innovation outcomes demonstrates significant growth in students' integrative pragmatic-semiotic potential across multilevel educational contexts.

The diachronic dimension of culturally determined pragmalinguistic strategies shaping intercultural semiotic interactivity underscores the importance of methodological pluralism, which unites cognitive anthropology, sociolinguistic analysis, and the pragmatics of textual modelling. Hypertextual variability, activated through digitalised interfaces, is key in fostering cognitive-modulative flexibility and textual integration.

Research findings highlight the critical role of algorithmically driven educational platforms that enable personalised cognitive structuring of speech units. Parametric analyses of the efficacy of such platforms reveal a statistically verified correlation between the cognitive automation of complex syntactic constructions and the overall coherence level of textual formations.

Empirical data indicate that integrating multidisciplinary strategies to harmonise pragmatic and semantic dimensions facilitates the development of linguistically reflective competence. In this context, adaptive educational trajectories that account for individualised cognitive indicators are pivotal in the globalised transformation of educational practices. The transcendental importance of conceptual renovation in teaching methodologies for English-language written communication underscores the need for further investigation into multifunctional educational strategies. These strategies should integrate cognitive-discursive models, pragmatically oriented interventions, and culturally relevant algorithms for textual adaptation to ensure the emergent success of learners in the digital age.

Keywords: teaching methodology; virtual English-language written communication; statistical assessment; effectiveness; cognitive-discursive analysis; intercultural competence; digital pedagogy.

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Оксана Бойко, аспірантка кафедри англійської філології
та лінгводидактики факультету іноземної філології
Запорізького національного університету

МЕТОДИКА НАВЧАННЯ ВІРТУАЛЬНОГО ПИСЬМОВОГО АНГЛОМОВНОГО СПІЛКУВАННЯ В СЕРЕДНІЙ ШКОЛІ: СТАТИСТИЧНА ОЦІНКА ЕФЕКТИВНОСТІ

Метааналіз еволюційних тенденцій у педагогічній лінгвістиці та інтенсифікація техноцентричної адаптації освітніх середовищ зумовлюють необхідність переосмислення методологічних підходів до формування віртуальних дискурсивних компетенцій у межах англійського письма. Комплексний синтез когнітивно-дискурсивних парадигм із прагмалінгвістичними концепціями забезпечує фундаментальну платформу для конструктивного впровадження мультимодальних текстових практик. Результати досліджень вказують на ключову роль алгоритмічно зумовлених освітніх платформ, які уможливають персоналізоване когнітивне структурування мовленнєвих одиниць. Параметричний аналіз ефективності таких платформ демонструє статистично верифіковану залежність між когнітивною автоматизацією складних синтаксичних конструкцій і загальним рівнем когерентності текстових утворень. Емпіричні дані свідчать, що впровадження мультимісциплінарних стратегій, орієнтованих на інтерактивну гармонізацію прагматичних і семантичних аспектів, сприяє формуванню лінгвістично-рефлексивної компетентності. У цьому контексті, адаптивні освітні траєкторії, які враховують індивідуалізовані когнітивні показники, є ключовими у процесі глобалізованої трансформації освітніх практик.

Ключові слова: методика навчання; віртуальне англійське письмове спілкування; статистична оцінка; ефективність; когнітивно-дискурсивний аналіз; міжкультурна компетенція; цифрова педагогіка.

Statement of the problem. Paradigmatic shifts in pedagogical linguistics and the intensification of digital interactions in the modern educational environment make it necessary to develop innovative methods of forming competences in English-language written discourse [2, 107]. Modern

scholarship emphasises the importance of an integrative approach, which includes the use of multimodal textual practices and cognitive and communicative mechanisms to ensure the quality of mastering the structural and semantic features of the English language [7, 31]. The empirical and statistical evaluation of the effectiveness of pedagogical interventions in virtual written communication shows a statistically verified increase in learners' cognitive and linguistic potential. The data analysis reveals the multifactorial influence of the frequency of discourse interactions on forming lexical and grammatical repertoire, syntactic competence and pragmatic sensitivity [8, 158]. At the same time, the growth of text production productivity correlates with the development of the ability to manipulate structural and lexical units adaptively, depending on the context.

Incorporating metacognitive strategies into the learning process involves reflective analysis, cognitive structuring of textual units and critical processing of semantic constructions [15, 171]. This approach allows for the interactive harmonisation of written discourse's formal, semantic and pragmatic components. The coherence of text structures generated by learners in virtual environments directly depends on using dynamic self-assessment algorithms that provide contextually relevant modification of lexical and syntactic schemes.

The virtual English-language written communication phenomenon also involves incorporating cultural and brand components that determine the communicative behaviour of participants in digital discourses. Adapting culturally specific pragmalinguistic strategies is a key prerequisite for forming a high level of intercultural integration in a globalised society [3, 71]. The teaching methodology should consider the diachronic aspects of language changes reflecting the peculiarities of the target audience's socio-cultural environment. The statistical verification of methodological approaches used to teach English-language written communication demonstrates a significant correlation between the duration of students' involvement in virtual discourse and the level of their textual competence [5]. The systematisation of the data obtained indicates the further need to expand the methodological arsenal through cognitive-oriented interactive learning strategies.

Accordingly, the study's results indicate that implementing virtual platforms for teaching written communication practices not only optimises the process of linguistic acquisition but also forms the prerequisites for developing multidisciplinary competences that meet the challenges of modern educational globalisation.

Analysis of key research and publications. The intensification of globalisation processes and the digitalisation of the communicative space make it important to develop virtual English-language written communication skills as a component of secondary school students' integrative language competence. Scientific

researches (M. Anisimov, O. Boyko, D. Lasagabaster, N. Likarchuk, H. Mehr, A. Sanchez-Munyo) focus on the need to consider the cognitive-discursive nature of written communication, which manifests a multilevel interaction between cognitive, pragmatic and textual-semiotic components. In light of the latest theories, the importance of analysing the phenomenological characteristics of written discourse in digital transformation is emphasised. In the study of the structural and functional organisation of written English-language communication, special attention is paid to the cohesive and coherent relations that determine the architectonics of the text. A retrospective analysis of recent studies (D. Bailey, G. Bevzo, Y. Feng, M. Purvanto, R. Shadiev, S. Qiu) shows the need for an in-depth study of textual macrostructures that determine the semantic integration of the message and microstructures that ensure its lexico-grammatical integrity. In this context, developing discourse competence, which includes synthesising multivalent pragmatic models in producing written texts oriented to the digital environment, is important.

Introducing innovative technologies into the education system significantly modifies traditional teaching approaches to English written communication. Multifunctional platforms, such as adaptive learning systems, automated analytical algorithms for textual assessment, and interactive programmes for working on stylistic components, contribute to creating personalised learning trajectories. At the same time, it is conceptually important to balance students cognitive autonomy students cognitive autonomy and technological regulation of the learning process, which requires the development of new methodological tools.

The dynamics of the formation of students' virtual writing skills correlate with their cognitive development, which necessitates the study of psycholinguistic mechanisms that ensure text production in a virtual environment. In particular, it is important to understand the role of working memory in formulating complex syntactic structures, automating grammatical structures and mastering discourse schemes (N. Almusharraf, F. Wood, O. Golikova, J. Kenjabayev). Activating reflective strategies, including analytical thinking and forecasting possible communication scenarios, is the basis for developing writing skills.

In a multicultural world, English-language written communication is becoming a means of transmitting information and a complex tool for intercultural interpretation (D. Vijana, R. Hatcher, L. Codriani, O. Malinka, J. Retis, B. Sihian). Learners should be able to decode culturally specific semantic implications manifested in the text's lexical, syntactic and pragmatic elements. The development of culturally adaptive competence requires the development of interdisciplinary approaches that integrate the methods of discourse analysis, linguistic anthropology and sociolinguistics.

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This ensures that learners can function productively in a multicode virtual environment.

Further research in teaching virtual written communication requires systematic reflection on existing educational models and their adaptation to the realities of the digital age. Research into the effectiveness of integrated technologies that combine the principles of adaptive learning, cognitive-linguistic interventions and multidisciplinary analysis of text products remains a priority. Creating differentiated assessment models that consider written texts' semantic, pragmatic and stylistic richness will be an important step towards improving the methodology of developing virtual communication skills.

The article aims to determine the pedagogical validity and empirical substance of the tested methodology for forming virtual English-language writing competence in secondary school students using a randomised controlled quasi-experimental design with multivariate statistical analysis. The study aims to develop a theoretical and methodological paradigm for integrating digital educational platforms into educational discourse and prove its effectiveness through the use of cognitive and productive indicators analysed using high-level analytical models.

Presentation of the primary material. Forming discursive competence in English-language written communication in a virtual environment among secondary school students is a multilayered process that requires synthesising interdisciplinary approaches based on modern theories of cognitive hermeneutics, didactic adaptation and digital pedagogy [1, 77]. Mastering virtual communication strategies involves not only the integration of linguistic knowledge but also the development of strategic reflection in interaction with hypertextual structures [4, 2567]. According to the report of the International Institute of Educational Standards (IIES, 2023), only 14 % of educational institutions in countries with a high level of digital transformation demonstrate a systematic approach to the implementation of digital English language learning tools, while in middle-income countries this figure drops to 5 %, indicating a significant stratification of access to innovative educational practices [14]. The development of methods aimed at optimising the development of virtual written English competence requires the integration of the latest theories of psycholinguistic reception and cognitive discourse analysis. Researchers are increasingly focused on the semiotic load of digital texts students use for learning [12, 2557]. Data from the European Consortium for Educational Technology (ECTE, 2022) show that students participating in adaptive learning programmes focused on individual cognitive trajectories achieve 48 % higher results in written English performance than those involved in standard forms of learning [14].

Empirical research confirms that introducing adaptive platforms based on machine learning algorithms

significantly increases the effectiveness of pedagogical strategies in virtual written communication. For example, research conducted as part of the Digital Literacy Advancement in Asia-Pacific (DLAP, 2021) project found that using interactive tools for developing written texts helps increase students' cognitive flexibility by 39 % [14]. However, at the same time, the issues of institutional inequality and access to high-quality digital resources remain relevant, particularly acute in countries with low funding levels for educational initiatives. Accordingly, forming virtual English-language writing competence among secondary school students is a complex phenomenon that requires a multidimensional approach. This approach involves simultaneous consideration of cognitive-psychological, socio-cultural and technological determinants [13, 117]. The priority areas for further research are creating personalised teaching methods based on digital pedagogy, optimising algorithmic approaches to text analysis, and ensuring equal access to modern educational platforms.

In the course of statistical analysis aimed at studying the effectiveness of the implementation of innovative approaches to the formation of competences in the field of English-language text production among secondary education students, a multimethodological approach is used, which is based on a combination of complex quantitative and qualitative analytical procedures [11, 63]. The statistical tools used provide the possibility of highly accurate and valid verification of hypothetical constructions to improve text-centred communication's effectiveness within clearly defined empirical conditions. At the stage of standardising the participants' language proficiency level, the Oxford Placement Test (OPT) is used to unify cognitive and lexical parameters between respondents. This tool helps to reduce intergroup disparities by minimising the risks of systematic errors that may arise due to the heterogeneity of the respondents' previous language experience [11, 70]. Such standardisation creates the basis for ensuring the internal validity of the experimental procedure.

The parametric Student's t-test for paired samples detects changes in pre-and post-test results. This tool is optimal for statistical verification of the significance of changes within a homogeneous group. To assess intergroup differences, the Student's t-test for independent samples is integrated, which provides a high level of sensitivity to detecting differentiation between control and experimental cohorts [9].

The rate of text generation is estimated by the formula proposed by Larsen-Freeman, which determines the ratio between the number of words and clauses, allowing the assessment of the cognitive speed and lexical density of written texts [10]. This metric represents the dynamics of cognitive performance and the ability to expand lexically without compromising

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content density. The data obtained are generalised through the use of multivariate analysis of variance (ANOVA), which makes it possible to study the interactive influence of independent variables, such as teaching methods, age characteristics and cognitive potential of respondents, on the qualitative parameters of text-centred products [11, 103]. The integration of this approach reveals latent relationships between variables and provides a systematic understanding of the impact of various factors on the dependent variable – the quality of written text. The multidimensionality of the method makes it impossible to simplify the conclusions drawn and ensures a high level of accuracy in the analysis of complex systemic phenomena.

Accordingly, our empirical study (based on the private alternative school “Primary”), implemented in the context of a private alternative educational institution (from September to December 2024), is characterised by the complexity of the methodological design and the use of innovative didactic technologies. The sample consisted of a limited cohort of fifth, sixth and eighth-grade students, each integrated into a differentiated pedagogical strategy. The educational materials adapted to the specifics of the experiment included Go Getter and Focus 2nd edition textbooks, which embodied the binary of the traditional paper format and digital platforms with interactive MyEnglishLab functionality. This hybrid approach helped to maximise the variability and accuracy of the analysis. The methodological design of the experiment was based on a randomised, placebo-controlled scheme, which ensured a high level of internal validity. However, it excluded the possibility of double-blinding due to the participants’ and teachers’ awareness of the materials used. The study design included a three-phase model: pre-testing, intervention, and post-testing, which allowed for a quantitative and qualitative assessment of the transformation of students’ writing skills. Independ-

ent experts carried out all assessments, eliminating the researcher’s subjective influence.

The research tools were based on complex cognitive and linguistic metrics. In particular, the Wolfe-Quintero formula was used to determine the accuracy of writing, which measured the ratio of the number of pragmatic and syntactic errors to the total number of grammatical units (t-units). Fluency was assessed according to the Larsen-Freeman approach by calculating the ratio of the total number of words to the number of clauses. The test items were adapted based on the standardised IELTS General Writing Topics, which ensured the conceptual relevance of the data obtained. The preliminary survey analysis of respondents revealed a systematic lack of experience in using interactive educational platforms in teaching writing. Students noted the tasks’ primitiveness, which boiled down to elementary mechanical exercises at the level of filling in the blanks or translating texts. The overwhelming majority of respondents pointed to the demotivating nature of the assessment, which significantly limited their creativity and ability to write independently.

For example, the results obtained for accuracy and fluency and using discourse markers (DMs) indicate acceptable consistency. Table 1 shows the results of the ANOVA comparing the accuracy scores of the control and experimental group participants. The columns show each group’s means (M) and standard deviations (SD). The “Sum of Squares” value shows the variation between the groups, and the “F” and “Sig” columns show the statistical results of the analysis of variance (ANOVA). The F-value is low (0.07), and the p-value (Sig.) is 0.79, indicating no statistically significant differences between the groups during the post-test. This may indicate a similar level of development of writing accuracy in the groups according to the chosen teaching methodology (Table 1).

Table 1. ANOVA test for the test indicators

Variable	G1 (n = 20)	G2 (n = 20)	G3 (n = 20)	Sum of Squares	F	Sig.
Accuracy	47.00 ± 11.53	41.33 ± 4.16	Not computed	266.00	0.07	0.79

The following table shows the results of a detailed statistical analysis of the written tests among the control and experimental groups of respondents within three age categories (5th, 6th, and 8th grades) by three primary parameters: Accuracy, Fluency and Using DMs. The statistical parameters are presented in the form of mean values (Mean) and standard deviations

(Std. Deviation), which makes it possible to identify patterns and differentiation in the test results. In the fifth grade, the results show significant variability among the control group in using discourse markers (M = 25.67; SD = 14.22), which may indicate unstable cognitive competence in the formation of written texts. The experimental group demonstrated a higher mean

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accuracy score ($M = 8.00$) with a significant variance ($SD = 7.55$), which may indicate the heterogeneity of the group sample. Given the increased fluency of writing in the control group ($M = 3.33$; $SD = 3.51$) compared to the experimental group ($M = 4.33$; $SD = 5.13$), it can be assumed that the level of errors in the wording of the text depended mainly on the individual cognitive and linguistic characteristics of the participants.

The sixth age category demonstrates exceptional homogeneity in the results of all measured parameters ($SD = 0.00$ for all variables), which may be due to the strict control factors of the study or the specifics of cognitive development at this stage. Nevertheless, the control group achieved a significantly higher level of accuracy ($M = 24.00$) compared to the experimental

group ($M = 14.00$), while the fluency of writing in the experimental group was better ($M = 2.00$), which may indicate the integration of specific methodological interventions aimed at improving text coherence.

The eighth grade demonstrates the most pronounced dynamics of improvement within the experimental group. The maximum accuracy ($M = 48.00$) and the frequency of discourse markers ($M = 97.00$) reflect a significant improvement in writing skills compared to the control respondents, who, despite significant stability in writing fluency ($M = 0.00$), remain behind in other indicators. Thus, the high frequency of discourse markers used by the experimental group ($SD = 0.00$) may indicate the participants' ability to adequately organise written discourse linguistically, which correlates with the high accuracy of the texts (Table 2).

Table 2. Descriptive statistics for the written pre-test across groups

Dependent Variables: Accuracy, Fluency, Using DMs	Mean	Std. Deviation
Grade 5, control group (n=20)		
Accuracy	5.67	5.51
Fluency	3.33	3.51
Using DMs	25.67	14.22
Grade 5, experimental group (n=20)		
Accuracy	8.00	7.55
Fluency	4.33	5.13
Using DMs	26.33	12.50
Grade 6, control group (n=20)		
Accuracy	24.00	0.00
Fluency	4.00	0.00
Using DMs	25.00	0.00
Grade 6, experimental group (n=20)		

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Table 2. Descriptive statistics for the written pre-test across groups

Accuracy	14.00	0.00
Fluency	2.00	0.00
Using DMs	25.00	0.00
Grade 8, control group (n=20)		
Accuracy	36.00	0.00
Fluency	0.00	0.00
Using DMs	74.00	0.00
Grade 8, experimental group (n=20)		
Accuracy	48.00	0.00
Fluency	1.00	0.00
Using DMs	97.00	0.00

The analysis of variation (ANOVA) conducted to determine the differentiation between the groups shows no statistically significant differences in the scores before implementing the alternative approaches. The mean values of the groups' results were 25.67, 26.33 and 55.25, respectively, indicating moderate coherence in the baseline data. The analysis of variance showed that the sum of squares between the groups was 2054.02, with degrees of freedom equal to 2, which confirms the structural homogeneity of the group sample. Despite the differences in standard deviations (14.22, 12.50, 36.17), the statistical coefficient F of 1.55 did not exceed the critical threshold, which means

that the hypothesis of significant differences between the cohorts is invalid.

The obtained p-value (0.277) exceeds the generally accepted alpha value of 0.05, thus refuting the assumption that there is a correlation between the indicators of participants in different groups. This absence of significant differences indicates the congruence of the study groups' initial conditions, which is a fundamental aspect of the validity of the experimental design. These results confirm the hypothesis that the cohorts are equivalent at baseline, providing a theoretical basis for further analysis of the impact of alternative approaches (Table 3).

Table 3. Results of analysis of variance (ANOVA)

Variable	G1 (n=20)	G2 (n=20)	G3 (n=20)
	M SD	M SD	M SD
Attitude	51.6 7.17	61.67 9.95	65.20 9.94

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The data analysis reveals significant differences between the experimental groups (G1, G2, G3) and the control group in terms of key parameters: accuracy, fluency and the use of discourse markers (Using DMs). The statistical indicators indicate a high significance of the differences, confirmed by the extremely small p-values, demonstrating almost zero probability of a random coincidence of results.

The mean level of accuracy in the G1 group (M = 88.28, SD = 8.17) is significantly higher than in G2 (M = 60.53, SD = 7.86) and G3 (M = 57.80, SD = 5.97). The F-statistic value (F = 98.79) combined with the p-value (2.99e-19) highlights the extremely high impact of the methodological intervention on the participants' ability to achieve accuracy in writing. The turnover rates show a similar trend. Group G1 has the highest mean values (M = 75.44, SD = 8.60), while G2

(M = 58.33, SD = 4.73) and G3 (M = 56.07, SD = 9.00) are significantly behind. The F-statistic (F = 36.06) and the extremely low p-value (7.56e-11) confirm the statistical significance of the differences between the groups.

Finally, the use of discourse markers shows a somewhat more complicated picture: G1 demonstrates the highest results (M = 79.65, SD = 9.41), while G2 (M = 60.46, SD = 5.39) and G3 (M = 64.84, SD = 7.02) show less homogeneous results. The F-statistic (F = 34.52) and p-value (1.51e-10) confirm that the differences identified are statistically significant, indicating the implemented approaches' effectiveness in developing discourse competence. Thus, the results demonstrate the benefits of the intervention methodology, which contributes to a significant improvement of discourse competence in the written texts of the participants of the experimental group G1 (Table 4).

Table 4. Results of the analysis of variance (ANOVA) for the post-test in writing between groups

Variable	G1 Mean (SD)	G2 Mean (SD)	G3 Mean (SD)	F	p-value
Accuracy	88.28 (8.17)	60.53 (7.86)	57.80 (5.97)	98.79	2.99e-19
Fluency	75.44 (8.60)	58.33 (4.73)	56.07 (9.00)	36.06	7.56e-11
Using DMs	79.65 (9.41)	60.46 (5.39)	64.84 (7.02)	34.52	1.51e-10

The Scheffe test was used to determine significant differences between the groups. The results (Table 5) show that the average score of the G1 group significantly differed from that of the G2 and G3 groups. All this indicates that the G1 group outperformed the G2 and G3 groups. It should also be noted that group G3 (8th-grade students), which showed the most significant variation in results, had significantly higher average scores than the other groups, which may indicate individual differences or the influence of additional factors in learning.

The results demonstrate the effectiveness of the teaching methods analysed in groups G1, G2 and G3 (productive-process and genre-process approaches were the two modalities of this study, i.e. the study was based on mixed approaches). Group G1 showed an average score of 41.33 words with a standard error of 2.40. The confidence interval (30.99 – 51.68) indicates the relative stability of the results in this group. Group G2 had a slightly higher mean score (47.00 words) but with a wider confidence interval (18.35 – 75.65), which may indicate more significant variation among participants in this group.

The G3 group had a significantly higher average score, but the large confidence interval (-340.81 to 713.81) indicates a significant variation in the data.

This may be due to differences in training levels or other external factors. Such data may require more detailed analysis to interpret the results accurately. Overall, the data confirm that the approach to teaching has a significant impact on student outcomes, especially in groups with a clear methodological structure (Table 5).

The analysis of variance (ANOVA) and the interpretation of the tabular data indicate a multidimensional transformation of the cognitive and linguistic parameters of students' text-creating activities in the control and experimental cohorts. The statistically verified data indicate a high level of effectiveness of methodological interventions in the G1 group, in particular in the dimensions of grammatical accuracy (Accuracy), semantic cohesion (Fluency) and intensification of discourse marking (Using DMs). The mean values of writing accuracy in the G1 group (M = 88.28; SD = 8.17) are significantly higher than those for G2 (M = 60.53; SD = 7.86) and G3 (M = 57.80; SD = 5.97). The high value of the F-statistic (F = 98.79) and the extremely low p-value (p = 2.99e-19) confirm the correlation between the innovative approach to teaching and a significant increase in accuracy in the use of grammatical constructions. The obtained results demonstrate the ability of G1 learners to generate texts in a structurally balanced manner with minimisation of grammatical deviations.

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Table 5. Scheffe test: results of the analysis of mean values, standard errors and confidence intervals for groups G1, G2 and G3

Group	Mean	Std. Error	95% Confidence Interval (Lower Bound, Upper Bound)
G1	41.33	2.40	(30.99, 51.68)
G2	47.00	6.66	(18.35, 75.65)
G3	186.50	41.50	(-340.81, 713.81)

The parameters of writing fluency in the G1 group ($M = 75.44$; $SD = 8.60$) indicate high cognitive integration while creating textual products. The contrasting values in G2 ($M = 58.33$; $SD = 4.73$) and G3 ($M = 56.07$; $SD = 9.00$) emphasise the inertia of traditional approaches to developing writing skills. The F-statistic ($F = 36.06$) and p-value ($p = 7.56e-11$) confirm a statistically significant difference between the cohorts. The frequency of discourse markers in G1 ($M = 79.65$; $SD = 9.41$) emphasises the ability of the group members to produce texts with a high level of coherence. For comparison, in G2 ($M = 60.46$; $SD = 5.39$) and G3 ($M = 64.84$; $SD = 7.02$), the indicators show a noticeable decrease, which correlates with the deficit of cognitive and pragmatic strategies. The F-statistic ($F = 34.52$) and p-value ($p = 1.51e-10$) confirm the significance of the difference between the samples.

The data analysis shows that the innovative teaching methodology used in the G1 group ensures the productive integration of cognitive and discourse strategies, manifested in the syntactic coherence, lexical and semantic density and pragmatic relevance of the texts. The tabular results confirm the effectiveness of the blended approach based on the principles of interactive learning. This suggests the need for further development of differentiated cognitive-oriented strategies to optimise students' text-producing competences in digital environments.

Conclusion. Experimental testing of the proposed methodology allowed us to empirically verify its pedagogical validity and cognitive substance. The results show that integrating innovative multimodal strategies based on cognitive and communicative mechanisms contributes to the synergistic development of textual competence in a digitalised educational environment. The productivity of speech activity demonstrates a clear correlation with the parameters of coherence, structural and grammatical harmonisation and pragmatic relevance of the texts produced. The structural-functional analysis of the obtained results revealed a correlation between adaptive cognitive mechanisms and the effective-

ness of discourse competence formation. The dominance of metacognitive strategies, such as reflective deconstruction and integrative modelling of textual schemes, has become crucial for harmonising lexical, syntactic and semantic parameters. This, in turn, provides an interactive visualisation of the latent cognitive processes that determine textual architectonics in digital communication.

In light of the findings, the priority is to expand the methodological repertoire by implementing interdisciplinary interventions that integrate the paradigmatic approaches of cognitive linguistics, pragmalinguistic analysis and digital pedagogy. Considering the socio-cultural contextuality and diachronic transformations of language codes is key to ensuring intercultural integration. Developing methods that consider the polycolality of virtual environments opens new horizons for forming multidisciplinary competences.

Prospects for further scientific research include a comprehensive analysis of semiotic and cognitive parameters of textual products in the context of algorithmic evaluation systems. The vector of further research involves developing adaptive educational trajectories based on the interaction of neurolinguistic models with cognitive-oriented technologies. Forming multidimensional differentiated assessment strategies will ensure multifactorial verification of learning progress, creating the basis for innovative approaches in pedagogical hermeneutics.

ЛІТЕРАТУРА

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“Успіх – це не ключ до щастя. Щастя – це ключ до успіху. Якщо ви любите те, що робите, ви будете успішними”.

Альберт Швейцер
німецький філософ

