European Journal of Contemporary Education

Has been issued since 2012

E-ISSN 2305-6746
2026. 15(1). Issued 4 times a year

Journal is indexed by: **Cross Ref** (USA)**, EBSCOhost Electronic Journals Service** (USA)**, Electronic scientific library** (Russian Federation), **Global Impact Factor** (Australia), **Index Copernicus** (Poland)**, Journal Index** (USA), **Open Academic Journals Index** (USA), **Scopus** (Netherlands), **Web of Science** (USA).

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Postal Address: 13906, Polarstone Ct., Houston, TX, USA 77044

Website: https://ejce.cherkasgu.press
E-mail: ejce.editor@cherkasgu.press

Founder and Editor: Cherkas Global University

Release date 31.03.26
Format 21 × 29,7/4.

Headset Georgia.

Order № 253.

European Journal of Contemporary Education

2026

Is. 1

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The Problems of Contemporary Education

European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 3-12
DOI: 10.13187/ejced.2026.1.3
https://ejce.cherkasgu.press

The Problems of Contemporary Education

Unlocking Language Learning: Boosting Vocabulary in Young EFL Learners by Nursery Rhymes in Turkey

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Abstract

Choosing an efficient technique for teaching vocabulary in second language acquisition is one of the most important aspects of language learning, and without it, communication is impossible. This topic is the subject of extensive investigation today. This study investigates the impact of nursery rhymes on vocabulary acquisition and motivation among young Turkish EFL learners, exploring potential gender-based differences in vocabulary performance. A sample of 40 non-randomly selected learners was divided into two groups: one using a traditional teaching method and the other nursery rhymes, with each group containing male and female participants. A pre-test ensured homogeneity between groups. After twelve weeks of instruction, with five sessions per week, an independent t-test was used to assess differences in vocabulary performance between the nursery rhyme and control group. Results indicated a significant positive effect of nursery rhymes on vocabulary acquisition and motivation, although no statistically significant gender differences were observed.

Keywords: nursery rhymes, vocabulary acquisition, language learning, motivation, gender differences, young learners.

1. Introduction

Vocabulary is an elementary part of language learning and the basis on which communicative competence and understanding are built (Nation, 2018). Webb and Nation have noted that vocabulary is a basic building block in language acquisition, especially so for children learning spoken and written language (2017). In their study, Karatas et al. (2021) observed that vocabulary teaching at the initial stage of any second language supports long-term retention and helps the

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creation of more accessible communication routes. Given this, without a solid vocabulary base, language learners tend to struggle in articulating their thoughts and exchanging conversations (Folse, 2016).

Recent research on vocabulary teaching strategies has gravitated towards strategies stretching beyond memorization, with Ellis (2017) insisting that engagement and interaction are central to vocabulary learning and drawing on the notion that active, contextually-rich instruction will foster better retention and understanding of new words. In Turkey, the frequent use of direct translation in vocabulary teaching means that students report difficulties in remembering words and a lack of strategies for vocabulary acquisition (Aslan, 2024). This supports the findings of Alhazmi (2024), who speaks of the need for techniques that incorporate auditory and visual aids in order to help learners in vocabulary retention in non-native contexts.

The use of music and rhythmic groups, especially nursery rhymes and songs, is increasingly popular as an effective medium for teaching new vocabularies. The feelgood factor of music based on Lozanov's (1978) suggestopedia method, which gives backing to music in language learning to uphold a relaxed, receptive state, has been established by more recent studies that have shown that music positively inscribes the word and increases learner's memory and engagement (Pavia et al., 2019). Music activates both hemispheres, calling upon cognitive and creative powers at the service of language acquisition, especially from the young learner who responds to rhythm and delivery without self-consciousness (Pastuszek-Lipińska, 2025). Eccles et al. (2011) explains how music adds support to phonological awareness, so that the ear for the word becomes a valuable ally in vocabulary acquisition.

Songs, an integral part of early childhood experiences, expose the student to the vocabulary repeatedly in an easily memorable way, aiding retention of vocabulary (Koelsch, 2025). Advances in educational technology make many songs readily available to the teacher, resulting in more stimulating lessons. Salcedo (2010) observes that the use of music in the classroom has helpful effects on vocabulary retention and lesson enjoyment, motivating students to learn. The repetitive nature of music, coupled with its emotional and mnemonic qualities, makes vocabulary learning more fun for kids (Li, Brand, 2019).

Yet another study finds that using songs helps vocabulary teaching not only by engraining words into memory but also by promoting phonological skills like rhyme and rhythm that contribute to language learning overall (Hamilton et al., 2024). Songs played in lessons often also the element of natural repetition, can further promote committing words to long term memory. Topal (2024) further state that incorporating music and rhythm into language teaching promotes learner participation and creates a positive atmosphere in the classroom, where actual language learning can take place.

Overall, embedding music and nursery rhymes into vocabulary instruction addresses several challenges in traditional vocabulary teaching by enhancing student engagement and supporting cognitive development. This approach aligns with modern under-standings of language acquisition, offering a holistic and enjoyable method for helping young EFL learners master vocabulary more effectively and with greater enthusiasm.

The Previous Research

In applied linguistics and language education, teaching vocabulary remains a crucial part of second language learning.

Since vocabulary is a constitutive element of fluency, or the proficiency of using a language, it is possible and important that young learners receive good vocabulary training. Many probable ways have been put forward to teach vocabulary, but we might mention the shift towards appealing tactics aimed at the emotional and/or cognitive needs of young learners.

Using nursery rhymes and music as teaching aids for language acquisition is a noteworthy strategy. For young EFL learners, research has repeatedly demonstrated that music improves memory retention and enriches the learning process (Fitria, 2023). According to Thornbury (2002), audiovisual tools provide a multimodal learning environment and greatly enhance comprehension and recall of new language. Nursery rhymes are a great way to help children learn new words because of their captivating tunes and rhythmic rhythms. Most of the researchers highlighted nursery rhymes' potential as useful tools in language teaching by pointing out that they can improve kids' word recognition abilities. More recent evidence also confirms that rhythm and melody help children detect word boundaries and enhance phonemic awareness from an early age (University of Cambridge, 2023).

Chomsky's (1982) theory that music engages both sides of the brain and cultivates a more balanced learning experience is consolidation for the music-language connection. This reinforces Krashen's (1985) emotional filter and intelligible input theories. Learners acquire new vocabulary through familiar language contexts that allow them to understand newer words. According to his emotional filter theory, learners are likely to engage more with the language when they are excited and self- confident, lowering acquisition barriers. Thus, it is proposed that adding nursery rhymes to the curriculum will enhance vocabulary acquisition by making the language more engaging and accessible. More recent classroom-based studies have shown that songs and TPR activities increase vocabulary retention and decrease anxiety among young EFL learners (Magnussen, Sukying 2021).

A conceptual framework for understanding how music and pictures might work together towards language acquisition, is found in Paivio's dual coding method (2007). According to this approach, students learn with verbal and non-verbal means. By using nursery rhymes wherein the lyrics are coupled with pictures to engage both strategies, learners will better be able to take words "down the ears' well", boosting their memory to learn and remember. By creating more channels to retrieve knowledge, this dual coding method enhances learning. Recent studies demonstrate that dual coding advective achieves greater academic success and long-term vocabulary retention (Mir et al., 2023; Miller, 2024).

The benefits of songs and rhymes in vocabulary teaching have been the focus of several studies. According to Chen et al (2024), music used in language lessons allows students to improve their speaking, auditory, reading and writing skills. Likewise, recent new studies have shown that music activities in the classroom encouraged students to be more fluent and confident as they acquired vocabulary. From these results one can conclude that music and nursery rhymes help foster a lively and fruitful atmosphere for language learning. They confirmed the general efficacy of song-based interventions for vocabulary acquisition in young second/foreign language learners (Acar, Çetin, 2025).

Bolduc and Lefebvre (2012) explore how using music raises the willingness of young learners to learn. When children hear enjoyable and personal things like nursery ryhmes, they want to get more involved and the joy they feel creates a higher chance of learning. These studies link nicely with Krashen's Affective Filter Hypothesis. Also, a study from Oman found that nursery rhymes improve comprehension and remembering abilities of kindergarten pupils (Rajan, Saadat, 2025).

Research by Zainol Abidini et al. (2008) further supports the importance of employing nursery rhymes for vocabulary development by showing that songs and music are more effective than conventional vocabulary teaching techniques. Acar & Çetin (2025) likewise found that music and rhythmic activities facilitate language acquisition, especially for teaching pronunciation.

As studies by Winter (2010) and Salcedo (2010) have shown, music can construct links for words, allowing users to learn the language through practice and repetition. To improvise language chunks adding in a rhyme or rhythm will entice rehearsal and memory improvement, Ludke et al. (2013) counter and state that music involvement strengthens the transferring of what has been learned to long-term memory. This is justified by the idea of melodic learning in which says rhythm and rhyme aids the memory process (Wikipedia, 2024).

With regard to Turkey, incorporating nursery rhymes as part of English lessons could be of great value. The socio-cultural questions surrounding teaching and learning the language in a foreign language context, calls for a fresh implementation of the material. There exists considerable supporting literature that utilizing nursery rhymes not only falls in line with young learners' learning needs, but are also used to motivate them further in their language learning.

Objectives and Research Questions

Gaps within the literature, was the motivation for the current study to investigate whether nursery rhymes could be pedagogically effective in an EFL context. Because songs are so multifaceted, they can be used for a variety of educational purposes in the learning of EFL. For example, it has been found that songs "can invite a greater degree of interaction and engagement in vocabulary learning" (Li, Brand, 2019), thus promoting learning. Hill (2013) claims "they bring images of reality into the unnatural world of the language classroom". Furthermore, the incorporation of visuals alongside songs can add an element of enjoyment to the classroom, facilitating a more relaxed atmosphere for learners. This environment encourages students to acquire new vocabulary with increased self-confidence and reduced anxiety when listening to nursery rhymes (Eccles et al., 2011).

Consequently, this research aims to:

1. Investigate the effect of using nursery rhymes in the classroom on enhancing young learners' vocabulary performance.
2. Examine the impact of nursery rhymes on children's motivation to learn vocabulary.
3. Explore potential differences between male and female learners in acquiring a foreign language vocabulary.

The following research question is intended to be addressed by this study:

– To what extent do nursery rhymes effect vocabulary performance and motivation of young Turkish male and female EFL learners?

The following hypothesis has been proposed to investigate this question:

– Nursery rhymes have no beneficial effects on the vocabulary performance or motivation of young Turkish EFL learners, and there is no discernible difference in the effects of using them in the classroom between male and female learners.

2. Methodology

The purpose of this study is to look into how nursery rhymes affect young Turkish EFL learners in terms of vocabulary development. Pretest, treatment, and posttest phases are all part of the quasi-experimental design used as the methodological framework in this investigation. Nursery rhymes are the independent variable, whereas vocabulary expansion is the dependent variable in this case.

Participants and Setting

A total of 40 beginner nursery students participated in the present study. Participants were selected through a non-random convenience sampling technique. All were native speakers of Turkish and ranged in age from 4 to 6 years. The sample was divided into two groups of 20 students each. To ensure gender balance, each group was composed of 10 male and 10 female students, thereby providing an equal representation of both genders across the study. The deliberate inclusion of an equal number of boys and girls was intended to control for potential gender-based differences in early language learning and classroom engagement, thereby enhancing the validity and generalizability of the findings.

Following main tools were utilized in this study to collect data:

Vocabulary Pre-Test and Post-Test: To compare the knowledge of EFL learners before to and following the nursery rhyme intervention, the researcher used vocabulary tests as methodological tools. The researcher's chosen and created nursery rhyme vocabulary served as the basis for both the pre-test and post-test. To make sure that all participants were at the same academic level and to guarantee learner homogeneity, the pre-test was given at the beginning of the semester. After that, the participants were split up into two groups: the experimental group, which was taught language through nursery rhymes, and the control group, which was taught vocabulary through traditional methods. A post-test was done at the end of semester to all students to evaluate the effect of nursery rhymes on vocabulary acquisition.

Nursery Rhymes: Twelve nursery rhymes were chosen as essential vocabulary-building resources. Throughout the teaching process, these rhymes provided fundamental support resources with the goal of enhancing the students' vocabulary via interesting and relevant content.

Interview: After vocabulary training and tests, learners' views regarding the usage of nursery rhymes were evaluated by asking questions chosen from a motivation questionnaire (Deci et al., 1991) because the children were illiterate. These items, which comprised many motivation-related statements, were selected from the questionnaire developed by Deci et al. (1991). With no right or wrong response, learners were invited to express their ideas regarding these claims, enabling sincere reflections on their experiences with the teaching methodology.

Procedure

This research was done in a public nursery school during the first semester of the academic year. A quasi- experimental pretest-treatment-posttest design was used. Since the vocabulary knowledge of their existing vocabulary was important for the study to be meaningful to tutorial and researcher alike, both groups took a pretest before being nonrandomly assigned to an experimental and control group. The participants were Turkish speaking, all were born in this country, were from Turkish-speaking families, and spoke English competently, aged from 4 to 6 years.

The researcher personally designed the vocabulary test, and the experimental group was taught by introducing nursery rhymes into the instructional materials in the class. Before

presenting any of the inferential null hypothesis statistical tests of significance or any appropriate descriptive tests, the Kolmogorov-Smirnov test demonstrated that, in general, the data met the parametric assumptions. A posttest was administered to both groups and the results compared.

Additionally, in the last week of the semester, an interview with items from the motivation questionnaire (Deci et al., 1991) was conducted to examine the learners' attitudes toward the learning of nursery rhymes in the classroom. To ensure clarity in equations and responses, the interview was held in the students' mother tongue.

The experimental group having been exposed to the nursery rhyme instruction, but both groups took the post-test and the participants of the experimental group were asked the interview questions to test their attitudinal disposition to the use of nursery rhyme as a learning activity. The researcher controlling all aspects of the study with great dexterity, from the pretest for the homogeneity of participant, through the interview questions and the post-test to conducting nursery rhyme instruction and deciding what materials to use, implicitly ensured internal validity.

3. Results

The descriptive measures for the experimental and control groups' vocabulary performance during the pretest and posttest phases are summarized in the following table.

Statistical Analysis

Prior to hypothesis testing, the normality of all continuous variables (pre-test and post-test vocabulary scores, as well as motivation scores) was examined using the Kolmogorov-Smirnov test, which confirmed that the data met the assumption of normal distribution ($p > .05$ for all variables). Homogeneity of variances between groups was assessed with Levene's test, the results of which are presented in Tables 2, 4, and 6. Because the assumptions of normality and homogeneity were satisfied, independent-samples t-tests were conducted to compare mean scores between the experimental and control groups, as well as between male and female participants. A two-tailed significance level of $\alpha = 0.05$ was adopted for all analyses. Descriptive statistics (means, standard deviations, minimum, and maximum scores) are reported alongside inferential statistics to provide a comprehensive interpretation of results.

Table 1. Descriptive Data on the Vocabulary Performance of the Participants

Groups	Number	Test phase	Mean	St. d	Minimum	Maximum
Control	20	Pretest	5.7	1.5	4.00	10.00
	20	Posttest	9.8	1.7	6.00	12.00
Experimental	20	Pretest	5.8	2.1	4.00	10.00
	20	posttest	12.6	1.6	8.00	15.00

The vocabulary performance differences between participants in the nursery rhyme and control groups were assessed using an independent t test. Table 1 shows that both the experimental and control groups' mean of vocabulary performance scores increased from the pretest to the posttest.

Table 2. Independent T-Test on Comparing the Vocabulary Performance

Levene's test		T-Test for Equality of Means				
F	Sig	T	Sig. (2-tailed)	Df	Mean Difference	Std. Error Difference
0.004	.94	-5.3	.001	38	-2.8	0.5

According to the statistical data in the above table, the vocabulary performance mean scores of the participants in the nursery rhyme and control groups differed by 0.05 at the significant level ($t = -5.3$, $df = 38$, $p = .001 > 0.05$).

The findings of the aforementioned independent t-test demonstrate that the use of nursery rhymes in the classroom significantly affects students' vocabulary proficiency.

The interviewees' answers were examined using an additional independent t-test, which measured the motivational differences between the experimental and control groups.

As the above table depicts there are differences in mean scores of motivation in control and experimental groups. Mean scores of motivation in the experimental group are higher than the control group.

Table 3. Descriptive Statistics on Participant's Motivation

Groups	Number	Mean	Std. Deviation
Control	20	63.5	2.4
Experimental	20	84.1	2.0

Table 4. Independent T-Test for Motivation of Two Groups

Levene's test		t-test for Equality of Means				
F	Sig	T	Sig. (2-tailed)	Df	Mean Difference	Std. Error Difference
1.5	.22	-6.5	.001	38	-20.6	3.1

The results in Table 4 indicate that the difference between the motivation scores of the two groups was statistically significant (t = -6.5, df = 38, p < .05). These findings demonstrate that the use of nursery rhymes significantly enhanced learners' motivation to acquire new vocabulary.

The disparities in vocabulary performance between male and female EFL learners were also assessed using an independent-samples t-test.

Table 5. Descriptive Statistics of Male and Female Participants' Vocabulary Performance

Groups	Number	Mean	Std. Deviation
Males	20	11.1	1.7
Females	20	11.2	2.6

As seen in Table 5, the mean vocabulary scores for females were slightly higher than those of males.

Table 6. Independent T-Test- Scores of Vocabulary Performances for Males and Females

Levene's test		t-test for Equality of Means				
F	Sig	T	Sig. (2-tailed)	Df	Mean Difference	Std. Error Difference
.08	.75	-.17	.84	38	-.12	0.70

The results presented in Table 6 indicate no statistically significant difference between male and female learners in terms of vocabulary performance (t = -0.17, df = 38, p > .05). This suggests that learners' gender did not influence their vocabulary proficiency in this study.

Overall, the statistical analyses revealed three major findings. First, the experimental group that received nursery rhyme-based instruction demonstrated significantly greater vocabulary gains than the control group, confirming the positive effect of music-integrated pedagogy on lexical development. Second, learners in the experimental group reported significantly higher motivation to learn new vocabulary, suggesting that nursery rhymes not only facilitate cognitive processing but also foster a more engaging and enjoyable learning environment. Finally, no significant difference was found between male and female participants' vocabulary scores, indicating that the effectiveness of nursery rhyme-based instruction was consistent across genders.

4. Discussion

Giving low-level pupils a wider vocabulary in an effective manner is still a major difficulty for teachers of young students. There are other ways to explain or demonstrate word meanings, however the current study concentrated on how well Turkish EFL young learners learned English vocabulary through the use of nursery rhymes. It was predicted that vocabulary performance would

improve with the use of nursery rhymes. The data analysis's findings showed that nursery rhymes significantly impacted EFL learners' vocabulary growth. The experimental group, which used nursery rhymes to teach vocabulary, fared noticeably better than the control group, which used conventional teaching techniques. This supports recent findings indicating that nursery rhymes are a potent tool for enhancing vocabulary development in young learners (Fitria, 2023).

Considering that both groups had a similar vocabulary knowledge base at the onset, the higher scores obtained from the post-test by the experimental group attest to the specific value of nursery rhymes in improving vocabulary learning. This must have something to do with the emotions encouraged by this rhythmic form of speech, as the most recent research confirms that infants listen to rhythmically spoken words (songs and nursery rhymes) to learn about word boundaries, even as newborns, as well as helping enhance phonemic awareness (University of Cambridge, 2023). Moreover, studies in EFL contexts show that song-based activities meaningfully boost vocabulary acquisition among young learners (Nikolovska, 2018).

Pictures and illustrations help clarify new words. Known as dual-coding theory, our visual and verbal memory are different pathways that aid in retaining information (Miller, 2024). Studies show the benefit of visuals; specifically, using educational programs involving graphics and dual-coding significantly helps vocabulary learning while improving overall academic success (Mir et al., 2023).

Nursery rhymes already provide words set in music and story. Pairing language with melody and movements brings greater understanding and memory of vocabulary and connects with modern ideas such as Melodic Learning theory which proposes that learning with the patterns of melody, rhythm, and rhyme leads to better storage and retrieval of information- think of the alphabet song as a prime example (Wikipedia, 2024).

A positive, friendly, low-anxiety classroom environment is also conducive to learning. Songs and rhymes can act to reduce affective filters (lowering anxiety, raising motivation and engagement), as described in Krashen's Affective Filter Hypothesis. Most recently, song-based and TPR (Total Physical Response) methods "lead to improvements in receptive and productive vocabulary" in young EFL students (Magnussen, Sukying 2021).

In addition, the benefits of using songs and rhymes for learning vocabulary have been substantiated in several recent studies. In Oman, Victorian nursery rhymes were found to aid the memorizing, understanding, and retaining of words in kindergarten pupils (Rajan, Saadat, 2025). A meta-analysis of song-based intervention in young second- or foreign language learners also endorses this tool, showing a favourable effect on vocabulary acquisition (Acar, Çetin, 2025).

In conclusion, the use of nursery rhymes for vocabulary enhancement can give language teachers "environmental" pedagogical tools, and by engaging emotions and combining some multi-sensory learning (auditory, visual, motor), while also offering low-anxiety social learning contexts promote meaningful, long-storage vocabulary attainment. Even considering the Turkish sociocultural/educational background, which is likely to make the learners a receptive target audience, nursery rhymes may help reaching and enticing language learning goals for non-native language learners.

5. Conclusion

This study has revealed that nursery rhymes can be of great value in teaching vocabulary to young EFL Turkish learners, that they make a positive effect on vocabulary performance and learners' motivation in contrast to their being taught in an ordinary way. The experimental group learnt better vocabulary words exposed to nursery rhymes compared to the control group group. It has been proved that songs and rhythmics strongly attracted learners' attention. Also nursery rhymes are sung to a pleasant melody and accompanied by pictures, nursery rhymes create a low-anxiety, fun-filled atmosphere in which children freely participate and remember the songs they play.

Moreover, results support the idea that music facilitation, by way of nursery rhymes, assists the creation of an emotionally conducive climate which lowers a level of anxiety and in turn increases confidence. The increased motivation of participants from the experimental group as compared to the control group seems to back this idea as nursery rhymes appear to have the ability to motivate. No gender differences were found in vocabulary, and boys and girls both showed improvement through the exposure of a nursery rhyme method.

These findings support those well-known theories of L2 acquisition such as Krashen's Affect Filter Hypothesis and Paivio's Dual Coding Theory which talk about the importance of infusing emotion into the learning environment, and appealing to multiple senses in the process of learning.

With positive effects recorded as a result of infusing nursery rhymes into the vocabulary lessons, we encourage teachers to "go for it" and try this kind of work in the hope that it will "sweeten" the pill of memorization. In summary, the use of nursery rhymes offers a promising and enjoyable strategy for language educators aiming to boost vocabulary acquisition and motivation in young EFL learners. Further studies should be done on the permanent gain of this mode, and how far back in our culture it can be used into whatever cultures and school systems will adopt it.

Implications, Suggestions, and Limitations

As Thornbury (2002) states, "without grammar very little can be conveyed, without vocabulary nothing can be conveyed". While much research has been done into the role of other factors in vocabulary development, this study highlights the important role of nursery rhymes on vocabulary development and language learning motivation, whilst also taking the learners' sex into account.

The findings offer several pedagogical implications:

The above findings have some implications for the teaching process as noticed below:

1. Vocabulary enrichment. As vocabulary teaching is difficult for foreign language teachers, L2 teachers can effectively and enjoyably surmount this dilemma by injecting pleasurable songs and humourous visuals, thus stimulating students' interest in vocabulary learning.

2. Curriculum content. Foreign language institutes can encouraged students in their vocabulary study through improving lesson plans by adding pleasurable songs and humourous visuals.

3. Teaching materials. Since music has significant effects on vocabulary learning, material writers, curriculum planners and syllabus designers of L2 text books should also add nursery rhymes with related song and interesting visuals.

4. Parents can practise the songs with their children further strengthening the imitative attempts in school in the home.

To build upon the findings of this study, several lines for future research are suggested:

1. Broader participant demographics: We conducted our study with very beginning learners, but similar studies could be done with students at different levels to see if nursery rhymes provide similar therapeutic benefits across ages, while controlling for gender.

2. Larger sample sizes: Re-creating our research with more participants to see if our findings are replicated leads to a more applicable study.

3. Other language skills: Studies on the impact nursery rhymes have on teaching other areas of language, such as grammar, listening comprehension, or pronunciation, could be informative.

4. Age: Exploring the effectiveness of nursery rhymes with learners of different ages could provide insights into age-specific strategies for vocabulary learning.

Limitations of the Study

Although the results provide useful evidence concerning the effect of nursery rhyme-based vocabulary instruction, there are several caveats to bear in mind. First, the students were selected using convenience sampling, which may limit the implications of the results for larger populations of young EFL learners. In addition, the relatively small sample and short treatment may not be sufficient to approximate the long-term effects of nursery rhymes. Other avenues of future research should include larger random samples, and longitudinal designs.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 13-23
DOI: 10.13187/ejced.2026.1.13
https://ejce.cherkasgu.press

Post-Institutional Period: Social Adaptation of Orphanage Graduates with Varying Levels of Hardiness

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Abstract

The transition to independent living presents substantial challenges to social adaptation for orphanage graduates, necessitating effective socio-psychological support. Focusing on the diagnosis and potential of key psychological personality resources – such as hardiness and its associated activity self-organization and volitional self-regulation – represents a novel contribution to research addressing this issue. The aim of this study is to examine the characteristics of activity self-organization and volitional self-regulation among orphanage graduates exhibiting varying levels of hardiness, and to identify the interrelationships between these factors and social adaptation during the post-institutional period. The study involved 140 graduates of orphanage institutions. The following assessment tools were used: Hardiness Survey by S. Maddi (adapted by D.A. Leontiev and E.I. Rasskazova); Activity Self-Organization Questionnaire by E.Yu. Mandrikova; Volitional Self-Regulation Questionnaire by A.G. Zverkov and E.V. Eidman. Statistical analysis was conducted using the one-sample Kolmogorov-Smirnov test, Mann-Whitney U-test, and Spearman's rank correlation coefficient (IBM SPSS Statistics 27.0). Orphanage graduates exhibited low to moderate levels of hardiness. They demonstrated a balanced profile of activity self-organization, characterized by average levels of planfulness, goal-directedness, persistence, and fixation. Graduates with moderate hardiness showed more pronounced self-organization abilities, while those with low hardiness displayed a present-oriented focus. Volitional self-regulation indices in both groups fell within the above-average range. Significant correlations were found between hardiness levels, components of self-organization, and volitional self-regulation indices, indicating the integrative nature of psychological mechanisms underlying social adaptation among orphanage graduates during the post-institutional period. The study demonstrates that hardiness serves as a system-forming psychological resource, integrating processes of activity self-organization and volitional regulation during the post-institutional socio-psychological adaptation of orphanage graduates.

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Keywords: hardiness, activity self-organization, volitional self-regulation, post-institutional period, orphanage graduates, children left without parental care, social adaptation.

1. Introduction

The problem of social adaptation among graduates of orphanages and children left without parental care remains highly relevant due to the acute need for effective socio-psychological support during the post-institutional period.

Currently, 31,600 orphans are registered in Russia, who, upon reaching adulthood, face significant challenges in social adaptation, as the transition to independent living becomes a critical period requiring maximum activation and stable functioning of individual psychological resources (Doroshenko, Rudenko, 2024). Despite legislative measures outlined in Federal Law No. 120-FZ of June 24, 1999, and Federal Law No. 159-FZ of December 21, 1996 (as amended on July 31, 2025), which address socialization issues for this category of children, the personality-level aspects remain underexplored. Consequently, the authors identify the following key problem: despite regulated state support and existing post-institutional accompaniment systems, the issue of low adaptation effectiveness persists, indicating the insufficiency of external measures alone and necessitating a deeper understanding of internal psychological mechanisms that determine the success of this transition (Telitsyna, Milakova, 2021; Kovaleva, Babina, 2024; Chernykh, 2021).

Thus, the purpose of this study was to examine the characteristics of activity self-organization and volitional self-regulation during the post-institutional period among orphans with varying levels of resilience, as well as to determine the relationships between the studied parameters. The tasks are implicitly derived from the methodology and structure of the work: assessing the level of personal resilience among orphans; evaluating the characteristics of activity self-organization; assessing the characteristics of volitional self-regulation; comparing indicators of activity self-organization and volitional self-regulation between groups of orphanage graduates with different resilience levels; analyzing the relationships between resilience levels and indicators of self-organization components, as well as volitional self-regulation indices.

The primary importance of post-institutional support, particularly socio-psychological adaptation, has been emphasized at both regional and federal levels in the Russian Federation (Anachko, 2020; Bobyleva, 2021; Nesterov, 2021; Timofeeva, 2020; Aleksandrov et al., 2021), as well as internationally (Nuñez et al., 2022).

Key factors of successful social adaptation for orphaned children include resilience, activity self-organization, and volitional self-regulation (Bobyleva, 2021; Dolgova, 2024; Kryuchkova, 2013; Leontiev, Rasskazova, 2011; Maddi, 2004; Sadyrova et al., 2025). Although resilience has been extensively studied, research specifically examining this personality trait among orphans during the post-institutional period remains limited.

Domestic studies on resilience can be categorized into several key directions: as an internal personality resource enabling coping with difficult life situations (Leontiev, Rasskazova, 2011; Oslon et al., 2022; Selezneva et al., 2024; Semya, 2021; Tsiring, 2009); considering the presence of significant adults and support systems that substantially contribute to the formation of resilience and volitional self-regulation (Merkul, Volchanskaya, 2023; Oslon et al., 2021; Tkachenko [Borzilova], Solonchenko, 2016); and for prognostic and intervention purposes in developing programs that include training in volitional self-regulation and self-organization to enhance resilience levels (Titova et al., 2019).

Internationally, recent years have seen rapid growth in interest regarding outcomes of care leavers transitioning to independent living. The most extensive experience in resilience theory research of this kind is represented in North America, Australia, Europe, as well as many African and Asian countries (Duggal, Wadhawan, 2021; Gomera, Mutambara, 2020; Mawila-Chauke, Munongi, 2025; Mishra, Sondhi, 2021; Schafer, 2022; Ulfah, 2023; Simben, Mokgatle, 2025; Ungar, Theron, 2020; van Breda, Reuben, 2025). Along with addressing care-leaving issues, authors note the absence of accompaniment programs and assistance in social adaptation, as well as legislation aimed at improving transition outcomes for children leaving care (Nuñez et al., 2022). In this regard, the Russian experience in post-institutional support has the potential to serve as a model for countries only beginning such practices (Doroshenko, Rudenko, 2024; Chernykh, 2021; Nesterov, 2021; Semya, 2021; Semya et al., 2024).

Successful social adaptation requires activating complex behavioral regulation processes (self-regulation), such as goal setting, value orientations, and moral attitudes. L.I. Antsyferova

points out that personal behavior is largely determined not by objectively given situations, but by their subjective evaluation and personal perception (Antsyferova, 1994). Accordingly, personality traits (independence, responsibility, persistence, flexibility, etc.) comprising the structures of self-organization, self-regulation, and resilience are of primary importance for successful adaptation and socialization, including during post-institutional patronage for persons from among orphans and children left without parental care (Telitsyna, Milakova, 2021; Merkul, Volchanskaya, 2023).

K. Bernard was the first who examined self-regulation scientifically, noting it as active regulation and homeostasis of the internal environment that ensures resilience (Bernard, 2010). Volitional regulation represents the conscious regulation by the individual's behavior, manifested in the ability to overcome internal and external difficulties on the path to goal achievement during purposeful actions. This is the level of arbitrary regulation, through which the individual intentionally modifies the meaning of actions or creates new ones, with behavioral manifestations in the form of coping behavior strategies that can be developed among orphans through networked interactions (Timofeeva, 2020; Barkova, 2016; Ivannikov, Monroz, 2014; Rovenko, 2025). Within a comprehensive approach, it has been noted that orphanage graduates with high resilience levels and pronounced self-organization components exhibit higher volitional self-regulation indices (Kunitsyna et al., 2022; Morosanova, 2021; Yanovskaya, 2013).

2. Materials and methods

The study was conducted at the child protection sector of the Education Department of the Oktyabrsky District Administration in Kamennolomni. It involved 140 graduates of organizations for orphans and children left without parental care, aged 18–23 years, including 46 males and 94 females. Participation was voluntary, and all participants were informed about the study's objectives and procedures.

To achieve the research objectives and test the hypotheses, the following psychodiagnostics instruments were employed:

Hardiness Test (S. Maddi, adapted by D.A. Leontiev, E.I. Rasskazova);

Activity Self-Organization Questionnaire (E.Yu. Mandrikova);

Volitional Self-Regulation Questionnaire (A.G. Zverkov, E.V. Eidman).

Data collection was conducted using a targeted online survey link on the Russian Testograf platform, with participants providing informed consent.

For statistical analysis of the results, frequency analysis and descriptive statistics were applied. As the one-sample Kolmogorov-Smirnov test indicated that sample distributions significantly deviated from normality for most variables ($p < 0.05$), nonparametric statistical methods were used: the Mann-Whitney U test for group comparisons and Spearman's rank correlation coefficient for examining relationships between the studied characteristics. Data processing was performed using the IBM SPSS Statistics 27.0 software package for the social sciences.

3. Results

Analysis of the obtained data revealed that 40.00 % of orphans exhibit low resilience levels (Group 1), 54.30 % demonstrate medium resilience levels (Group 2), and 5.70 % show high resilience levels. Given that the high resilience level was identified in a statistically small number of respondents, these participants were excluded from subsequent analysis. Consequently, high resilience is not characteristic for orphans overall.

Examination of activity self-organization indicators in the formed groups yielded the results presented in Table 1.

Table 1. Indicators of components of self-organization among groups of orphaned children with differing levels of hardiness

Scale	Group 1 n = 56		Group 2 n = 76	
	M	SD	M	SD
Planfulness	17,54	5,71	18,68	5,15
Goal-directedness	32,36	6,77	34,87	4,49

Persistence	20,25	5,96	24,50	5,44
Fixation	22,54	4,58	21,21	5,01
Self-organization	10,91	4,32	9,34	4,75
Orientation to the present	10,21	2,43	12,57	1,13

As evident from the table, both groups of respondents demonstrate moderate levels of overall activity self-organization development, as well as moderate levels across all its components – planfulness, goal-directedness, persistence, and fixation.

To determine the significance of differences between groups of orphans with low and medium resilience levels, the Mann-Whitney U test was applied (Table 2).

Table 2. Mann-Whitney U-test indicators

Scale	U-test	p-value
Planfulness	1966,000	0,454
Goal-directedness	1670,000	0,032*
Persistence	1314,000	0,0001**
Fixation	1966,000	0,453
Self-organization	1618,000	0,019*
Orientation to the present	1628,000	0,019*

Notes: * – $p < 0.05$; ** – $p < 0.01$

Our analysis established that orphans with low resilience levels exhibit more pronounced overall self-organization, whereas those with medium resilience levels demonstrate stronger present orientation, goal-directedness, and persistence. Consequently, orphans with low resilience, likely perceiving their vulnerability to life's challenges, tend to utilize various external means for organizing their activities and life, which may serve as a specific protective mechanism. The pursuit of enhanced control over their lives through meticulous organization, planning, and adherence to specific algorithms may function for them as a mean of reducing anxiety and enhancing feelings of security amid perceived environmental instability.

Orphans with medium resilience levels demonstrate a more pronounced ability to live "here and now," focusing on the present moment and maximizing its opportunities. This temporal orientation indicates a more adaptive time perception, enabling flexible responses to current circumstances without excessive fixation on past experiences or future uncertainty. The capacity to value and fully engages in the present moment represents a critical component of psychological well-being and may facilitate more successful adaptation of orphanage graduates to independent living. At the same time, they exhibit stronger goal-directedness and persistence. They possess sufficiently clear life goals and aspirations but are not always rigidly oriented toward their achievement, maintaining flexibility to adjust priorities based on emerging opportunities. In overcoming difficulties, orphans with medium resilience demonstrate adequate persistence, exerting necessary volitional effort to resolve emerging problems without excessive stubbornness in situations requiring strategy changes. This balance between perseverance and flexibility may be as a result from institutional living experiences, where both asserting personal interests and adapting to group norms are essential.

The results of volitional self-regulation analysis across the formed groups are presented in Table 3.

As evident from the table, all components of volitional self-regulation in both groups fall within the high values range, with no significant differences between groups identified: volitional self-regulation index ($U = 1882.500$, $p = 0.306$), persistence index ($U = 1912.500$, $p = 0.399$), self-control index ($U = 2002.000$, $p = 0.560$). Therefore, orphans in both groups demonstrate sufficiently developed volitional self-regulation.

Table 3. Index scores for volitional self-regulation in groups of orphaned children with differing levels of hardiness

Scale	Group 1 n = 56		Group 2 n = 76	
	M	SD	M	SD
Index of Volitional Self-Regulation	13,54	3,54	14,97	3,66
Index of Persistence	9,32	2,80	9,44	2,37
Index of Self-Control	8,25	2,18	9,34	2,24

Spearman's rank correlation coefficient analysis, aimed at identifying relationships between resilience levels, activity self-organization, and volitional self-regulation, revealed significant correlations presented in Table 4.

Table 4. Results of the correlational analysis between level of hardiness, self-organization of activity, and volitional self-regulation

Scale	Hardiness	
	r-Spearman	p-value
Planfulness	0,042	0,625
Goal-directedness	0,266	0,001**
Persistence	0,283	0,001**
Fixation	-0,113	0,186
Self-organization	-0,033	0,701
Orientation to the present	0,310	0,0001**
Index of Volitional Self-Regulation	0,432	0,0001**
Index of Persistence	0,448	0,0001**
Index of Self-Control	0,415	0,0001**

Notes: * – $p < 0.05$; ** – $p < 0.01$

The data indicate that resilience level significantly positively correlates with three components of activity self-organization – goal-directedness, persistence, and present orientation and with three volitional self-regulation indices: volitional self-regulation index, self-control index, and persistence index. Thus, we can assert that an increase in orphans' resilience is associated with enhanced goal-directedness, persistence, and present orientation, facilitating current task resolution without distraction by past experiences or unfounded future daydreaming, as well as with the development of self-control and volitional regulation of behavior, activity, and communication.

Thus, our study confirmed that orphans predominantly exhibit medium and low resilience levels. Content differences between groups were also identified:

– Orphans with medium resilience levels demonstrate more pronounced self-organization abilities;

– Orphans with low resilience levels show more pronounced present orientation, goal-directedness, and persistence.

Meanwhile, volitional self-regulation indices in both groups remain in the high values range, indicating the formation of basic mechanisms of arbitrary behavior regulation.

Correlation analysis revealed statistically significant relationships between resilience levels, certain self-organization components, and volitional self-regulation indices, underscoring the integrative nature of psychological adaptation and personality development mechanisms during the post-institutional period.

4. Discussion

The obtained results verify the hypothesis within the framework of domestic scientific schools (Leontiev, Rasskazova, 2011; Titova et al., 2019; Morosanova, 2021). L.I. Antsyferova emphasizes that independence, responsibility, persistence, flexibility, and other traits comprising the structures of self-organization, volitional self-regulation, and personality resilience play a determining role in ensuring effective functioning of the subject under complex life conditions (Antsyferova, 1994). Our study demonstrated that among orphans with low resilience levels, the self-organization component is most pronounced. This phenomenon can be explained by several interrelated psychological mechanisms characteristic of this group of orphans. Compensatory mechanism, high self-organization may serve as compensation for insufficient resilience. Lacking adequate internal resources to counter stress, orphans develop external control structures. Adaptive survival strategy – in institutional upbringing conditions, strict self-organization often represents an essential survival and adaptation skill. Hypercontrol as protection – low resilience is accompanied by heightened anxiety, which orphans attempt to compensate through intensified control over external life aspects. External structure substituting internal stability – without sufficient internal resources (resilience), they create external structures (self-organization) to ensure stability. Rigidity of psychological defenses – high self-organization may reflect the rigidity of psychological defenses typical of individuals with low resilience.

In the group with medium resilience levels, present orientation, goal-directedness, and persistence are most pronounced. This can be explained by psychological mechanisms characteristic of this group of orphans. Basic security – medium resilience levels provide sufficient psychological safety to "release" rigid control and live in the present moment. Adaptive flexibility – medium resilience enables easier adaptation to current circumstances without fixating on future planning out of fear. Tolerance for uncertainty – with a certain resilience reserve, orphans can better tolerate uncertainty and focus on the present moment. Development of self-regulation skills – medium resilience levels are often accompanied by more developed emotional self-regulation skills, facilitating better presence "here and now." Reduced fixation on traumatic experience – medium resilience may indicate better processing of traumatic experiences, reduce future anxiety and enable present-moment living.

Thus, the paradoxical combination of low resilience and high self-organization can be regarded as a protective-compensatory mechanism, whereas present orientation, goal-directedness, and persistence at medium resilience levels reflect a more adaptive psychological functioning strategy.

Resilience is positively associated with personality traits implying its activity, i.e., engagement in societal life activities. Among orphans, activity manifests weakly due to virtually absent engagement in various activities under deprivation conditions while still under care. Reduced initiative and activity are characteristics of learned helplessness. The low and medium resilience levels with correspondingly low and medium engagement indicators precisely demonstrate this fact, which aligns with D.A. Tsering's research concluding that "the phenomena of autonomy and personal helplessness are closely linked to human resilience levels" (Tsiring, 2009: 341).

Successful social adaptation requires activating complex behavioral regulation processes (self-regulation), such as goal setting, value orientations, and moral attitudes. Our results demonstrate this tendency; however, stress resistance (resilience) remains low to medium, making goal setting alone insufficient for achievement. Activity, initiative, and decision-making ability in changing conditions are necessary. Orphans possess emotional regulation skills and the ability to control emotional manifestations, developed in institutional living conditions, but lack more flexible decision-making skills accounting for changing environmental conditions. Nevertheless, the sufficient development of volitional qualities among all respondents, regardless of resilience level, indicates a pronounced tendency to complete initiated actions aimed at achieving set goals. This reasoning finds confirmation in the emotional model presented in G.V. Vanakova's research, which directly links resilience with emotional-volitional self-regulation (Vanakova, 2012).

L.P. Kryuchkova emphasizes that developing high resilience levels among orphanage graduates, particularly the control component, requires consistent adult support for the child's initiatives in coping with increasingly complex tasks (Kryuchkova, 2013). Environmental variability and heterogeneity contribute to risk acceptance as specific experience utilized in later life. Our findings confirm this necessity. We can conclude that our respondents received insufficient adult support, both in terms of involvement and risk acceptance, as a factor for acquiring experience

applicable in various life situations. Based on our results, it can be stated that the absence of significant adults is characteristic of our sample. The relationship between resilience and the presence of significant adults among children left without parental care is confirmed by studies by N.S. Tkachenko (Borzilova) and colleagues (Tkachenko [Borzilova], Solonchenko, 2016).

Emotional-volitional regulation manifests behaviorally through coping strategies (Barkova, 2016). D.A. Leontiev and E.I. Rasskazova identified positive correlations between resilience and coping strategies of planning and positive reappraisal (Leontiev, Rasskazova, 2011). In our study, orphanage graduates exhibit moderate levels of systematicity, goal-directedness, persistence, and fixation, indicating moderately developed self-organization abilities. K. Bernard refers to resilience as the volitional component of self-organization (Bernard, 2010).

The logic of reasoning derived from our findings and colleagues' research enables identification of reasons why orphans with low resilience may demonstrate high volitional self-regulation:

Activation of compensatory mechanisms. Orphans may develop strong volitional self-regulation to compensate for the lack of external support and structure. When external resources are limited, internal control mechanisms become more critical.

Adaptive survival strategy. In institutional upbringing, strict rule adherence and self-control are often necessary to avoid punishment and gain approval.

Dissociation of emotional and behavioral components. A child may learn to control behavior while feeling emotionally vulnerable and unstable.

Early responsibility. Orphans are often forced to assume life responsibilities earlier, fostering self-regulation skills.

Protective mechanism. High volitional self-regulation may serve as protection from traumatic experiences, maintaining control over behavior.

Absence of healthy emotional regulation models. A child may master external behavioral control but lacks skills for managing internal emotional states.

Supercompensation. The drive to prove adequacy and overcome stigmatization may lead to excessive development of volitional qualities.

Fragmentation of psychological resources. High volition regulation may coexist with low resilience if other psychological well-being components (meaning-making, social support) remain underdeveloped.

Yu.V. Selezneva et al. note that resilience is associated with the temporal perspective of a negative past. Significant self-regulation resources influencing its operational-technical and personality components include time attitude and resilience. According to our results, respondents with medium resilience levels demonstrate present orientation, indicating readiness to live in the present day, considering current life situations and managing their time effectively (Selezneva et al., 2024).

Thus, our study confirmed the role of resilience as a factor in activity self-organization during the social adaptation of orphans in the post-institutional period. Additionally, we obtained results indicating sufficiently high volitional self-regulation among orphans, representing their internal resource that enables coping with difficulties despite medium and low resilience levels.

Our findings regarding the relationships between resilience and three components of activity self-organization – goal-directedness, persistence, and present orientation – as well as with three volitional self-regulation indices – volitional self-regulation index, self-control index, and persistence index – are consistent with research by V.I. Morosanova (2021), E.I. Titova et al. (2019), D.A. Leontiev and E.I. Rasskazova (2011), and others. These studies identified significant positive correlations between activity self-organization components (goal-directedness, persistence, present orientation) and resilience, as well as between volitional self-regulation indices and resilience.

The results also reveal gaps in the socio-psychological preparation of orphans for independent living, in their emotional and psychological support by educators and staff of orphanages and organizations for children left without parental care, and in the diagnostics of orphans' personality characteristics and prediction of difficulties they will encounter in independent life. These findings align with research by A. Meshelova et al. (2025), A. Sadyrova and Z. Simtikov (2025). Among the problems faced by orphans during the post-institutional period, studies note the lack of social and emotional support due to inadequate preparation of orphanage educators and the absence of a comprehensive approach to pupil accompaniment (Popov et al., 2025).

5. Conclusion

Thus, the article presents the results of a study that for the first time examined activity self-organization and volitional self-regulation during the post-institutional period among orphans with varying resilience levels. The empirical data analysis conducted in the study demonstrates the need for differentiated psychological and pedagogical support: the obtained results can be utilized by psychological services to develop targeted individual accompaniment programs, taking into account resilience levels when planning support, adapting the intensity of assistance to orphans' needs, and gradually reducing the degree of accompaniment as independence grows.

Future research directions include examining resilience, self-organization, and volitional self-regulation as factors of social adaptation among graduates of organizations for orphaned children, considering gender factors or the current situation in the country during the Special Military Operation period.

6. Acknowledgments

The authors express their gratitude to the Administration of the Oktyabrsky District of Rostov Oblast, Kamenolomni Settlement, represented by Yulia V. Gavrilova, for creating conditions that enabled empirical research. Special thanks go to the reviewers for their constructive comments and recommendations for improving the article.

7. Conflict of interest

The authors declare no conflict of interest.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 24-38
DOI: 10.13187/ejced.2026.1.24
https://ejce.cherkasgu.press

Combating Foreign Language Anxiety in Translation Students by Developing Learner Autonomy

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Abstract

The present research paper investigates the issue of foreign language anxiety among translation students in Russia and suggests the way to diminish it by developing learner autonomy. The authors conducted an experiment during the second semester of 2023–2024 academic year, (117 participants) and found out that female students are more anxious than their male counterparts, undergraduate students are more prone to foreign language anxiety compared to younger students since they have to take state exams and defend their diploma papers. Junior students are more concerned about interpersonal communication, whereas undergraduates have more problems with negative assessment and test anxiety. By developing learner autonomy, it has become possible to diminish foreign language anxiety and at the same time make students more responsible and motivated. Personal and competence-based components of learner autonomy primarily contribute to lower foreign language anxiety.

Keywords: foreign languages, learner anxiety, learner autonomy, translator in VOLL, self-esteem.

1. Introduction

The present study is quite topical since mastering foreign languages greatly depends on learners' psychological readiness to acquire knowledge, overcome barriers, be fully aware of one's abilities and potential, cope with tests and unfamiliar environment, communicate with teachers, classmates and native speakers. Psychological problems, such as anxiety, apprehension, nervousness, fear of making mistakes, confidence gap, are known to impair cognitive functioning, disrupt memory, lead to avoidance behavior (Macintyre, Gardner, 1991; Tsiplakides, Keramida,

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2009), thus worsening the process of knowledge acquisition and, consequently, the final result (Abdurahman, Rizqi, 2020; Alrabai, 2014; Song, 2024).

Questions concerning language anxiety came into focus of the following researchers' attention: Ma et al. (2018), Kochkonbaeva et al. (2023), Horwitz et al. (1986), Lopukhina et al. (2024). Western researchers (Horwitz et al., 1986) developed a Foreign Language Classroom Anxiety Scale (FLCAS), consisting of 33 questions based on the Likert scale. The topic of foreign language anxiety (FLA) has become popular in the East as well (Al-Saraj, 2014; Dong, 2021; Liu, Chen, 2013; Lu, Liu, 2011; Yan, Liang, 2022). Russian scientists made their contribution to the study of the issue of foreign language anxiety. Among them Brovko et al. (2024), Galishnikova (2014), Andryushkina (2020), Kayavo (2021), Rafikova (2022), Sholokhova (2022), Usmanova et al. (2022), Doronina (2022) and others.

As some studies show (Ter-Minasova, 2005), the problem of FLA can also depend on the nature of the system of education as a whole, its focus on the final result and high performance; hence, it may be country-specific. Magdy et al. (2014) claims that more research is needed to determine whether Western tools and methods are applicable to other educational and cultural contexts.

Today's imperative for students of non-linguistic universities under the program of translator in VOLL (vocationally-oriented language learning) in Russia is to master one or several foreign languages at C1 (CEFR levels) for their future professional oral and written communication. Since, according to curriculum, such students have less time to acquire the necessary skills compared to their counterparts in linguistics, the problem of finding ways and means to cope with foreign language anxiety becomes quite relevant.

At the same time, equally important is the issue of developing learner autonomy. According to the authors' previous studies (Chernova, 2018; Chernova et al., 2018; Chernova et al., 2019), the primary objective of universities should be fostering a motivated and creative learner, ready to take full responsibility for his/her learning outcome, to be an independent and autonomous personality and in some situations to be one's own supervisor and tutor (Chernova et al., 2020; Chernova, Litvinov, 2022).

In the current conditions, however, as far as the level of learner autonomy in Russia is concerned, there is a lot of room for improvement. Consequently, the key objective for Russian universities is to create the environment to foster an autonomous personality able to take responsibility for one's studies and at the same time decrease anxiety.

In this paper the authors have attempted to diminish FLA by means of developing learner autonomy.

2. Materials and methods

A more general understanding of anxiety can help better comprehend FLA. In Philosophy and Psychology there formed a certain philosophical view of the problem of anxiety as a particular trait of personality and his/her individual reaction to stress factors going along with increased apprehensiveness and uncertainty (Luria, 2022; Sidorov, 2013).

Macintyre and Gardner (1991) singled out three characterizations of anxiety: trait, state, and situation-specific anxiety. A Dictionary of Psychology defines trait anxiety as a person's general or characteristic level of anxiety (Colman, 2015). State anxiety is "a relatively temporary feeling of worry experienced in relation to some particular event or act" (Brown, 2007: 390). Situation-specific anxiety is provoked by a specific set of conditions. As far as education is concerned, common anxiety-provoking situations involve public speaking, tests and examinations, and speaking in class (Gadzaova et al., 2024). In each situation, some individuals tend to experience more anxiety than others.

An original viewpoint was expressed in the Russian Psychology by Bozhovich (1995), who singled out two types of anxiety: adequate, which reflects objective lack of conditions to satisfy needs, and inadequate, which arises even if such conditions are available. In the latter case one can speak about anxiety as a stable functional structure of emotional sphere, permanent personal complex. In the present paper we do not consider this type of anxiety. Our attention has been focused on situation-specific (adequate) anxiety.

Prikhozhan (1998) distinguishes partial (specific) and generalized anxiety, with the former being a normal reaction to a potential threat to an individual's idea of one's competence, as a search for means to overcome this threat. The researcher does not consider this type of anxiety to

be a personal complex. It is a kind of a function of unfavourable communication environment, e.g., specific demands to the interlocutor or low value of his/her efforts. When it becomes possible to change the system of relations in communication or the position of a partner who has anxiety, then anxiety disappears. The authors consider the change of position of communicating partners to be an effective tool in diminishing anxiety when a learner becomes a coach.

When learning a foreign language, foreign language anxiety arises. Horwitz et al. (1986, p. 128) define FLA as, "a distinct complex of self-perceptions, beliefs, feelings, and behaviors related to language learning arising from the uniqueness of the (foreign) language learning process". The process of learning a new language triggers anxiety in various types of students, not only in those who are naturally inclined to anxiety (trait anxiety). Hence, FLA can be characterized as situation-specific rather than trait anxiety (Teimouri et al., 2019).

The manifestation of the following behavioral patterns can be regarded as FLA: disruptive behavior as a defense mechanism to be less vulnerable and emotionally-exposed (Ehrman, 1996); slow learning of a foreign language (FL) (Zhuzeyev et al., 2024); avoidance behavior (missing classes, being late), physical actions, physical ailments and a wide range of culture-specific signs (Oxford, 2005); evasion of "risky" behavior (e.g., public speaking) (Macintyre, Gardner, 1994; Steinberg, Horwitz, 1986). Some students may become anxious over their performance and develop a fear of failing (Ehrman, 1996). If a student demonstrates a bunch of such behaviors, he/she is likely to be unwilling to take part in class activities and study well. Though, the symptoms of anxiety should be distinguished from the lack of motivation and/or interest to the learning process.

Researchers in different countries conducted a number of studies devoted to the connection between FLA and other variables (Oteir, Al-Otaibi, 2019), such as willingness to communicate (Kalsoom et al., 2020; Yan et al., 2018), learning style and strategies (Alamer, Almulhim, 2021; Demir, Zaimoğlu, 2021; Ghafourina, 2023), self-esteem and self-confidence (Bensalem, Thompson, 2021; Wang et al., 2022), motivation (Alamer, Almulhim, 2021), individual differences of learners (Pan, Lou, 2023; Subatira et al., 2020), teacher's behaviour (Djafri, Wimbarti, 2018).

The most common tool to assess FLA has been FLCAS, designed by Horwitz et al. (1986). The FLCAS is a 33-item questionnaire which uses a five-point rating scale (the Likert scale). It assesses issues related to communication apprehension, test anxiety, and fear of negative evaluation. The FLCAS was based primarily on the authors' experience with college students attending 'support groups' for foreign language learners. The items of the questionnaire describe specific situations that might trigger anxiety in students making the FLCAS an assessment tool of situation-specific anxiety.

Some researchers (Liu, Li, 2019) have criticized the FLCAS since "many of the items appear to be tapping students' perceptions and attitudes about language as well as their feelings about anxiety" (Sparks, Ganschow, 2022: 202), while Onwuegbuzie et al. (1999) found a strong correlation between FLA and foreign language achievement. In the present research, the authors adopted the situation-specific approach used by Horwitz et al. (1986) since, in our opinion, the situation-specific characteristic of FLA is most consistent with its definition and provides numerous advantages for conceptualizing and assessing anxiety.

Mihaljević Djigunović (2002, p. 164) divides FLA into three levels: low (<76), medium (76–119), and high (>119).

According to Oxford (2005), anxiety is always expressed within a context with cultural norms being part of that context. Western researchers (Horwitz et al., 1986; Zaripova et al., 2023) have found that FLA manifests itself primarily in listening and speaking activities in a foreign language.

In Russia, the system of education itself affects learners and their anxiety. According to Ter-Minasova (2005), it is focused more on perfectionism and is theoretically-oriented regardless of learners' practical needs and development of communicative skills. Russian researchers consider it to be very demanding (Khudobina et al., 2019; Rasskazova et al., 2017; Stakanova, 2018). Stakanova (2018, pp. 29-30) claims that teachers are like 'error hunters', so they involuntary discourage students, since the latter are afraid of speaking, experimenting, and making mistakes. Thus, students have higher anxiety when speaking and listening (Iksanova et al., 2021; Khudobina et al., 2019 Shepelenko, 2017). The primary anxiety-triggers are spontaneous discourse, fear of negative assessment from the teacher and peers, dull educational process including memorizing vocabulary and grammar (Kaskevich, 2012). Besides, any previous negative experience of language

learning in childhood can affect further mastering of FL in adolescence and adult life (Kazennaya, 2020; Khodyakov, 2013; Shchaveleva, Naumenko, 2022).

The above-mentioned factors signify that FLA in universities around the globe is a topical issue; therefore, the authors suggest developing learner autonomy as one of the possible ways to diminish anxiety.

There are different opinions on learner autonomy among researchers (Bekbayeva et al., 2022; Korotaeva, Kapustina, 2022; Koryakovceva, 2001). We define learner autonomy as "an ability of an individual to consciously carry out his educational activities aimed at creating a personally significant educational product, self-reflex and adequately evaluate this product, accumulate positive experience, interact constructively and creatively with the educational environment and members of educational activities, taking responsibility for the process and product of this activity" (Chernova, 2018: 28).

The authors identified the following components in the structure of learner autonomy: motivational, personal and competence-based, and classified skills necessary for would-be translators in VOLL to develop their autonomy into the following groups: 1) general skills (goal-setting, planning, self-correction, self-control, an ability of self-forming transfer skills, use technical learning aids, reference and information search); 2) special skills (communicative skills by types of speech activity, characterizing the level of proficiency in a foreign language as a means of communication); 3) intellectual skills (an ability to compare, generalize, analyze and systematize information, argue, draw conclusions, establish cause-and-effect relationships, classify, draw analogies, logically comprehend the material, highlighting the main idea); 4) psychological-characteorological skills (persistence, attention, good memory, high performance, perception, will, reflection, an ability to conduct self-monitoring and introspection, to give an adequate self-assessment of one's activities, to be aware of one's motives) (Chernova, Litvinov, 2022: 370). General skills play a major role in the development of learner autonomy of would-be translators in VOLL.

3. Purpose of the study

This study focuses on investigating the factors which triggered FLA among students of various age and gender groups and identifying the ways to diminish it, taking into account the specific traits of the Russian system of education. Besides, it is necessary to analyze which components of learner autonomy were developed better than the others and to make use of them for the purpose of diminishing FLA.

Taking into account the fact that in the present research the authors conduct interdisciplinary studies, the research questions are as follows:

1. What factors triggered FLA among students of different gender and age?
2. Which more developed components of learner autonomy in students may contribute to diminishing their FLA?
3. What are the ways to reduce FLA in the Russian system of education?

4. Method

In the present research, the authors used both theoretical (analysis, synthesis, generalization, putting forward hypotheses), and empirical (questionnaires, tests) methods. Also the authors used an experimental method of assigning students as tutors to a weaker group and then exchanging their roles.

To determine the students' progress in mastering the selected grammar points, the authors used a 100-point test designed according to the Program of translator in VOLL.

4.1. Participants

The research was conducted during the spring semester 2023-2024 academic year with 117 students (86 (73.5 %) were female, and 31 (26.5 %) were male) from Peoples' Friendship University of Russia named after Patrice Lumumba (RUDN University), Academy of Engineering (Departments of Mechanics and Mechatronics, Innovative Management in Industries, Civil Engineering, Architecture, Machine Building, Transport, Oil and Gas Engineering) and Economics faculty.

Nowadays STEM education in Russia is rather popular with women, there are some specialties, like architecture, where female students predominate.

4.2. Research tools

The researchers used the following methods: the FLCAS, a questionnaire consisting of open-ended and closed-ended questions, and Entry and Final tests composed according to the Program of translator in VOLL, methodologies by Rokeach (2009) and Kozlov et al. (2002) as data collection tools. The questionnaire, created on the basis of specialized literature and the authors' own experience, was primarily examined by experts (two linguists and two psychologists). The authors made adjustments according to their recommendations. As far as the FLCAS is concerned, FLA was subdivided into barriers in interpersonal communication (questions 1, 9, 14, 18, 24, 27, 28, 32); negative assessment (questions 3, 7 , 13, 15, 20, 23, 25, 31, 33); fear of tests (questions 2, 8, 10, 19, 21); psychological problems during the lesson (questions 4, 5, 6, 11, 12, 16, 17, 22, 26, 29, 30).

4.3. Procedure

Firstly, researchers selected grammar points to be studied during the spring semester, according to the Program of translator in VOLL.

All participating students answered questions in the Entry test to check their background knowledge and in the FLCAS questionnaire (1 week).

During the semester (16 weeks) each student who mastered some grammar point according to the Program, was assigned to be a tutor to a group of students who were weak in this material. The student-tutor prepared theoretical material and some examples and reported at the lesson. The class translated his/her examples from Russian into English. If there were any mistakes, the student-tutor corrected them and explained why it was a mistake. After that he/she composed ten sentences on this grammar material and set an assignment to his/her students to translate them from Russian into English at home. The students translated the sentences and sent them back to the student-tutor to be checked. If a student made any mistakes, then the tutor gave him/her another ten sentences to be translated. The cycle repeated until he/she made no errors. Thus, at the end of the term all students tried themselves in the role of the tutor, exchanging it with student's role.

Finally, all participants took the Final test and again answered the FLCAS questionnaire and the questionnaire designed by the researchers (1 week).

The questionnaire designed by the researchers:

Sex (male, female)

Year of study (1, 2, 3, 4)

1) What is your purpose of studying a foreign language? (work, travel, education abroad, other)?
2) What was your level of English when you entered the university? (A1, A2, B1, B2, C1, C2)
3) What is your level of English now? (A1, A2, B1, B2, C1, C2)
4) What level would you like to acquire when you graduate?
5) Are you satisfied with your progress in learning a foreign language? (Yes/No)
6) When prevents you from achieving your goal?
7) What do you like most of all when learning a foreign language?
8) What activities at the lesson stimulate your interest to learning a foreign language?
9) What should be improved/changed at the lessons of foreign language?
10) Describe your feelings when you played a role of a foreign language teacher.

4.4. Data collection and analysis

The data collection was conducted by foreign language professors in their classrooms with the students' consent to be research participants.

For data analysis, the authors used software Statistica Professional 10.0 developed by StatSoft, a useful tool for statistical analysis that helps to mine, control, analyze and visualize data with the help of statistical methods. To calculate the level of FLA the researchers made use of the methodology, proposed by Mihaljević Djigunović (Mihaljević Djigunović, 2002).

The present paper is the first stage of a wider research into efficiency of the proposed model involving students-tutors. At the next stage the authors plan to further study factors of diminishing anxiety and checking correlation between different parameters, e.g., motivation of learning a foreign language, intensity of the need to communicate, teacher's behaviour, etc. The engagement of students-tutors as an effective method will be used in experimental groups to be compared with control groups who are nor involved in the model.

The results obtained are the initial step of more extensive work to be continued since it is rather topical for the Russian system of education and need to be studied and analyzed in detail.

5. Results

5.1. Factors triggering FLA among students of different gender and age

At the beginning and at the end of the term, after analyzing students' answers to the FLCAS and the questionnaire, as well as the results of the Entry and Final tests, with regard to the first research question, the authors found out the following:

a) Female students experience more anxiety than their male counterparts (Table 1).

Table 1. The level of FLA depending on the gender

The number of respondents	Gender	Sampling mean (beginning of the term)	Cronbach's alpha (beginning of the term)	Sampling mean (end of the term)	Cronbach's alpha (end of the term)
86	F	97.131	0.824	90.570	0.836
31	M	87.386	0.876	82.000	0.725

b) As for the year of study, fourth-year students experience the highest level of anxiety, which can be explained by a higher responsibility since they took their state exams and defended their diploma papers to get a Bachelor's degree in late spring and early summer. First-year students rank the second at the beginning of the semester because they get into new environment and have to get used and adapt to new people, new circumstances, new requirements and demands (Table 2).

Table 2. The level of FLA depending on the year of study

The number of respondents	Year of study	FLA Total (M ± SD) (beginning of the term)	Sampling mean (beginning of the term)	Cronbach's alpha (beginning of the term)	FLA Total (M ± SD) (end of the term)	Sampling mean (end of the term)	Cronbach's alpha (end of the term)
18	1	86.94 ± 16.43	93.957	0.828	86.94 ± 16.43	86.440	0.841
58	2	88.29 ± 14.91	91.154	0.837	89.32 ± 15.16	88.293	0.814
26	3	86.80 ± 15.59	88.476	0.867	89.14 ± 12.97	86.385	0.851
15	4	93.27 ± 15.58	95.445	0.909	99.25 ± 18.89	93.267	0.814

c) As far as the aspects of FLA are concerned, first, second and third-year students are more concerned about interpersonal communication, whereas fourth-year students have more problems with fear of tests and negative assessment (Tables 3-4).

Table 3. Aspects of FLA depending on the year of study

Year of study	Aspects of FLA	Sampling mean (beginning of the term)	Sampling mean (end of the term)
1	Fear of interpersonal communication	30.783	29.384
	Fear of negative assessment	24.348	22.111
	Fear of tests	23.261	21.389
	Psychological problems during the lesson	14.304	14.056
2	Fear of interpersonal communication	31.000	30.276
	Fear of negative assessment	23.154	22.586
	Fear of tests	22.346	21.086
	Psychological problems during the lesson	14.654	14.345

Year of study	Aspects of FLA	Sampling mean (beginning of the term)	Sampling mean (end of the term)
3	Fear of interpersonal communication	29.000	28.731
	Fear of negative assessment	22.952	22.615
	Fear of tests	22.333	21.346
	Psychological problems during the lesson	14.191	13.692
4	Fear of interpersonal communication	23.556	22.600
	Fear of negative assessment	24.667	24.466
	Fear of tests	32.778	31.933
	Psychological problems during the lesson	14.444	14.267

Table 4. Aspects of Foreign Language Anxiety Depending on the Year of Study (Mean ± SD)

Year of study	Period	Interpersonal Communication (M ± SD)	Negative Assessment (M ± SD)	Test Anxiety (M ± SD)	Psychological Problems During the Lesson (M ± SD)
1	beginning of the term	23.11 ± 3.14	22.11 ± 7.75	14.06 ± 2.24	27.67 ± 5.77
	end of the term	23.11 ± 3.14	22.11 ± 7.75	14.06 ± 2.24	27.67 ± 5.77
2	beginning of the term	22.76 ± 2.53	22.59 ± 8.13	14.34 ± 2.24	28.60 ± 5.29
	end of the term	22.88 ± 2.54	23.04 ± 8.41	14.36 ± 2.25	29.04 ± 5.39
3	beginning of the term	22.56 ± 3.39	22.72 ± 8.29	13.88 ± 2.03	27.64 ± 5.92
	end of the term	23.14 ± 4.85	23.43 ± 8.04	13.86 ± 1.86	28.71 ± 5.50
4	beginning of the term	23.33 ± 2.23	24.47 ± 8.70	14.27 ± 2.19	31.20 ± 5.88
	end of the term	24.00 ± 2.33	27.13 ± 10.74	15.13 ± 1.96	33.00 ± 7.09

The table presents mean scores and standard deviations for each FLA aspect across different years of study at the beginning and at the end of the semester. The inclusion of standard deviations allows for the assessment of within-group variability and provides a more comprehensive description of the distribution of anxiety levels among students.

d) Most participating students have medium level of FLA (Tables 5-7).

The table presents mean scores and standard deviations for each FLA aspect across different years of study at the beginning and at the end of the semester. The inclusion of standard deviations allows for the assessment of within-group variability and provides a more comprehensive description of the distribution of anxiety levels among students.

Table 5. Overall level of FLA (the number of participants)

low		medium		high	
Beginning of the term	End of the term	Beginning of the term	End of the term	Beginning of the term	End of the term
14.53 %	19.67 %	76.92 %	74.35 %	8.55 %	5.98 %

Table 6. Level of FLA depending on the gender (the number of participants)

Gender	low		medium		high	
	Beginning of the term	End of the term	Beginning of the term	End of the term	Beginning of the term	End of the term
M	22.58 %	32.25 %	70.97 %	64.52 %	6.45 %	3.23 %
F	11.63 %	15.12 %	79.07 %	77.90 %	9.30 %	6.98 %

Table 7. Level of FLA depending of the year of study (the number of participants)

Year of study	low		medium		high	
	Beginning of the term	End of the term	Beginning of the term	End of the term	Beginning of the term	End of the term
1	11.11 %	22.22 %	77.78 %	72.22 %	11.11 %	5.56 %
2	13.79 %	18.97 %	77.59 %	74.13 %	8.62 %	6.90 %
3	19.23 %	23.08 %	73.08 %	73.07 %	7.69 %	3.85 %
4	13.33 %	13.33 %	73.34 %	80.00 %	13.33 %	6.67 %

The reliability of the FLCAS was checked by calculating Cronbach's alpha; the reliability coefficient for this instrument is 0.855 for the beginning of the semester and 0.821 for the end.

5.2. Components of learner autonomy contributing to diminishing students' FLA

As far as the second research question is concerned, analysis of the results of the Final test, as well as the answers to the FLCAS and the questionnaire designed by the researchers at the end of the term have demonstrated that personal and competence-based components of learner autonomy primarily contribute to lower FLA. Students, being 'tutors' for their groupmates and exchanging their roles, become more responsible, motivated and proficient in the foreign language, develop communicative and information search skills, creativity; an ability to systemize and analyze information. All this leads to diminishing FLA.

a) The results of the Final test demonstrate that all participating students have mastered the studied material and got positive results (Table 7).

Table 7. Results of the Final test at the end of the term (the number of participants and their grades)

Year of study	A	B	C	D	E	FX	F
1	16.67 %	38.89 %	22.22 %	16.67 %	5.55 %	0 %	0 %
2	13.79 %	18.97 %	37.93 %	20.69 %	8.62 %	0 %	0 %
3	15.39 %	19.23 %	26.92 %	23.08 %	15.38 %	0 %	0 %
4	13.33 %	53.33 %	33.34 %	0 %	0 %	0 %	0 %

b) As far the questionnaire is concerned, most respondents learn English to find a better job (85.47 %), to continue their education in Russia or abroad (76.92 %); to travel (66.67 %); to communicate with native speakers and people who do not know Russian (41.03 %); to watch films, read books, newspapers and manuals in the original (29.91 %). Some students like learning a language for self-development and self-improvement, they tend to life-long learning (15.38 %). While others would like to move abroad (2.56 %). About 20 % of the respondents gave extended answers, which shows their interest to the subject under discussion.

Most students enrolled at the university with B1 level (35.19%), followed by A2 (24.07%), B2 (22.22 %), C1(9.29 %), A1(9.23 %). Currently, most of the respondents assess their level as B2 (43.21 %), followed by B1 (25.93%), A2 (19.75%), C1 (11.11 %). As for graduation, most students expect to master the language at C1 (54.32 %), B2 (23.46 %), and C2 (22.22 %). The Program of translator in VOLL envisages C1 level at graduation.

The majority of students (53.09 %) are satisfied with their progress in learning a foreign language. Those students who are not quite satisfied with their progress consider lack of time, practice, motivation or discipline; home assignment (too complicated, too easy, too much);

misunderstanding with the teacher; fast pace; absence of the final goal and no opportunity of taking international exams in Russia as main barriers to mastering a language.

When answering the question about students' likes in learning a foreign language at the university, the answers differed markedly, including discussions of interesting topics, regular classes, teacher's approach and methods, groupmates, vocational themes, atmosphere at the lessons, creative activities, native speakers, writing essays, etc. Among stimulating activities, the respondents singled out talks, dialogues, debates, discussions; project work; games; watching video and short films; competitions, quizzes; preparing reports and teachers' attitude.

Students put forward the following proposals to improve the lessons and stimulate their motivation: include more interactive activities, more lessons with native speakers, a wider use of visual aids, more case studies to discuss. Also, they expect a more individual approach from their teachers, to take part in speaking clubs, to learn informal English and slang. And they would welcome an opportunity to have more lessons of a foreign language in the curriculum.

The respondents shared their feelings and emotions while being tutors to the groupmates:

"Every time I am anxious being a teacher, since I am aware that I can make a mistake. But then I tell myself that I am not a robot, but a human being. All human beings make mistakes".

"It was pretty complicated, but interesting".

"It was very interesting to be a person who knows more than others".

"I am a bit worried, but at the same time happy if I managed to explain the material so that my students understand it".

"I feel anxiety and awe at the same time".

"I adore English. And the most rewarding part in being a teacher is when you see the result of your work – when your students become motivated and interested in learning a language and their eyes light up'.

'The most difficult for me was to be patient when my students did not understand or made mistakes. I do not know how our teachers can be that patient with students."

"On the one hand, I was self-confident because I knew more than others, on the other – I felt anxious to make everything understandable and interesting".

"I felt high responsibility for my students. My task was to explain the material in such a manner so that they could understand it and use in practice without any mistakes".

'I wondered if my students would be able to understand my explanation, and when I saw they did, I felt delighted that I can give somebody new knowledge".

As can be seen from the information above, the students-tutors were anxious to do their best, to share their knowledge, and felt responsible for others.

5.3. Ways to reduce FLA in the Russian system of education

The analysis of the third research question has indicated that FLA is an inevitable barrier when learning foreign languages (Antineskul, Sheveleva, 2017; Aydin, 2018; Kozubovskaya, Sentebova, 2015). Some strategies to bring the barrier down have been described in literature (Iksanova et al., 2021; Mouhoubi-Messadh, Khaldi, 2022; Skelly, Estrada-Chichon, 2021).

When developing an approach to reduce FLA in Russia, it is necessary to bear in mind that it can be done by overcoming barriers and stereotypes, sometimes negative attitude towards learning a foreign language, often caused by previous experience (Anosova, Sorokoumova, 2022; Chen, 2023; Sanakoeva, 2022); making educational process more diverse and creative, being the 21th century professor and playing the roles relevant to today's teaching (Lueke, Lueke, 2019; Neerukonda, 2020; Serdyuk et al., 2020), using modern ICT, LMSs and VR technologies, mobile learning, an environment students are familiar with and in which they feel more self-confident; motivating students by creating a more friendly and less tense atmosphere at the lesson. In the present paper, the authors made a successful attempt to diminish FLA by helping students develop learner autonomy, scaffolding them at an initial stage, and later expressing trust in their abilities of self-monitoring, self-control, and self-correction.

6. Discussion

In the present study, several research questions have been considered. Firstly, the authors made an attempt to identify factors triggering FLA among students of different gender and age. The research findings revealed that female students were more anxious than male students; graduate students had the highest level of anxiety, followed by first-year students. As for the fourth-year students, they had to focus on their English diploma as well as engineering diploma

and state exams in both English and major subjects. All these factors resulted in a high level of stress and anxiety, lack of time, and sometimes sleep deprivation. Taking into account the fact that it was their first degree, it was a novel experience for the students and rather frustrating. As far as first-year students are concerned, university environment including new subjects, groupmates, professors, exams, demands and discipline, was a barrier to overcome, circumstances to get accustomed to, which, in turn, led to more anxiety. As regard to the aspects of FLA, younger students demonstrated fear of interpersonal communication whereas senior students were more concerned about tests and negative assessment.

These findings have been partly evidenced by those reported by Kalganova and Mardanshina (2015) and Fedorovsky and Atamanova (2023) with female students being more anxious than their male groupmates. Though the outcomes of this study do not go along with that of Kalganova and Mardanshina in the level of anxiety of different age groups and aspects of FLA. In their research first-year students were the most anxious, with fifth-year students being the least; first and second-year students were more concerned about tests while fifth-year students had more problems with interpersonal communication.

The analysis of the second research question has indicated that personal and competence-based components of learner autonomy primarily contribute to lower FLA.

Personal component of learner autonomy means adequate self-esteem, qualities and habits that contribute to raising efficiency of independent activities (hard work, time-management), psychic qualities of personality (memory, attention span) necessary for autonomous work. Initial requirements for would-be translators in VOLL include personal qualities (high responsibility, resilience, ability for self-criticism, emotional stability), psychocognitive (good memory, creativity, ability to concentrate, logic, intuition). Competence-based component includes knowledge, abilities and skills of goal-setting, planning, work with different sources of information, self-control, self-analysis and self-correctness, etc. (Chernova, 2018).

While playing a tutor's role, students developed their general skills (as well as special ones) of planning, self-correction, self-control; an ability to use reference and information search, visual aids; design schemes, graphs, and mind maps to explain their material; check their students' understanding, and speculate. According to Koryakovceva (2001), an autonomous learner is able to select the necessary means to solve the task, choose required strategies and approaches; control the outcome; evaluate the effectiveness and efficiency of the strategies and approaches used; self-regulate the results of the task.

The findings related to the third research question suggest that developing learner autonomy may contribute to reducing the level of foreign language anxiety. Providing initial guidance and consultation, fostering students' confidence, and gradually supporting them in overcoming linguistic barriers appear to be associated with improved emotional comfort and lower anxiety levels. It is illustrated by the results of the Final test, answers to the FLCAS and the questionnaire designed by the researchers.

The study has several limitations. The sample was gender-imbalanced and consisted of students from specific faculties of a single university, which limits the generalizability of the findings, and the quasi-experimental design without a control group makes it difficult to attribute the observed reduction in foreign language anxiety exclusively to the intervention. Future research should address these limitations by including control groups and applying inferential statistical methods, such as paired-samples t-tests or ANOVA, to determine whether the observed changes are statistically significant.

The present study provides the potential for future research in diminishing FLA by developing learner autonomy. Further studies using delayed post-tests seem necessary to ensure that the efficiency of the proposed technology promotes both short-term and long-term mastering of English by taking away obstacles to a better command of the language in the form of FLA.

7. Conclusion

The present research has studied factors that can trigger FLA among students of different age and gender groups under the Program of translator in VOLL in Russia. The key ones are as follows: interpersonal communication among younger students and negative assessment and fear of tests in case of undergraduates.

Besides, the authors identified components of learner autonomy that can help diminish FLA, with the most essential being personal and competence-based ones. During the study, participants

played the roles of tutors and students taking them in turn, being 'experts' in some particular area of grammar. This technology helped them take more responsibility, increase their motivation and knowledge of English, feel more confident communicating with peers and the teacher, presenting in the class in front of the audience, feel less nervous during the tests, and, ultimately, decreased their FLA.

It should be noted that the issue of FLA is a complex one and requires further research overall and in respect to the Russian system of education.

7. Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

8. Author contributions

OCh developed the concept, designed the methodology, collected and analyzed the data. AL prepared the original draft of the manuscript. TE provided supervision, reviewed and edited the manuscript. VS validated the findings and managed the project.

8. Funding

This paper has been supported by the RUDN University Strategic Academic Leadership Program.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 39-49
DOI: 10.13187/ejced.2026.1.39
https://ejce.cherkasgu.press

Challenges and Coping Mechanisms of Alternative Learning System (ALS) Teachers

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Abstract

In the Philippines, the Alternative Learning System (ALS) provides a practical option to the existing formal instruction. When an individual does not have or cannot afford to access formal education, ALS is an alternate or ancillary. Nevertheless, ALS teachers experience difficulties like restricted ability or resources to deliver lesson effectively and handling learners with different characteristics, abilities, and learning needs. The study is anchored on Lazarus and Folkman's Theory of Stress and Coping (1984), which focused to the level of challenges by the ALS teachers, the coping mechanisms, and how these relates to demographic profiles (age, teaching experience, and educational attainment).

Data were gathered from 48 ALS teachers using descriptive-correlational design through the Coping Strategies Inventory (CSI) and Perceived Stress Scale (PSS). It was revealed that ALS teachers experienced moderate challenges (M = 3.15) and employed adaptive coping mechanisms (M = 4.06) in most instances. Differences in the challenges encountered by the ALS teachers were tested using analysis of variance (ANOVA), with age, educational attainment and sex as independent variables.

Some coping strategies (i.e., promoting collaboration between community and adaptive teaching) were directly related to low levels of perceived stress. Such findings underscore the need for targeted interventions by demographic factors, specifically target professional development and systemic support. And by tackling these challenges, they empower teachers to strengthen their resilience and learner outcomes and, as a result, equitable education for everyone.

Keywords: Alternative Learning System, challenges, coping strategies, perceived stress, demographic factors.

1. Introduction

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The Alternative Learning System (ALS) continues to operate in a number of distant areas of the country, including large urban centers and smaller provincial communities by offering alternative course schedules to out-of-school youth planning to complete their elementary education. The ALS is an important program in the initiative to promote equity in education aiming to provide fully subsidized, equitable, sustainable, and appropriate alternative learning system pathways for learners who are located in areas that have limited or no access to formal education institutions.

ALS teachers face many organizational and managerial issues (Baccal, Ormilla, 2022). Outdated instructional materials and poorly written modules have also created additional challenges for teachers when adapting content to meet learners' needs (Cagang, 2014). Aside from teaching challenges are organizational problems consisting of insufficient institutional funding, late release of allowances and the limited availability of established learning hubs intensify these limitations (Francisco, Buri, 2024; Arpilleda et al., 2018). The shortage of permanent venues for teaching disturbs regularity and weakens the consistency of service implementation, particularly in geographically detached communities.

Teaching assignment loads also pile on the professional obligation of ALS teachers. Many are designated to various learning centers situated far from one another, causing in heightened travel time and widened field hours (Agayon et al., 2022). This several-center arrangement not only forces teachers' physical strength but also changes their work-family integration and mental well-being. In addition to learner-specific factors, there are many other barriers to education due to the complexity of education. For example, frequent absenteeism (due mainly to business and family commitments) can negatively impact the structure of lessons and how quickly students can learn (Campilla et al., 2023). Moreover, the structural and contextual barriers of teaching in the ALS environment show that the ALS is more than just a classroom; it requires both commitment for an extended period of time and the ability to adapt to change continually.

In this regard, the teaching of English literacy contributes to the overall teaching of any subject area currently taught in the classrooms. Being able to read and write in English is very often linked to having access to more employment and having access to information from around the world.

For learners from poor backgrounds, reinforcing literacy abilities is viewed as a means toward improved economic mobility. However, adopting literacy gaps while steering material shortage and unpredictable learning situation raises the intellectual and emotional needs identified on teachers. Thus, pedagogical problems in ALS go beyond logistical concerns and affect teacher effectiveness and well-being.

While studies have classified shared challenges within ALS, less consideration has been given to the coping mechanisms teachers use to handle these needs and how such approaches relate to their stress levels. Coping strategies, whether problem-focused, emotion-focused, or avoidance-oriented, are fundamental to understanding teacher resilience and sustained performance. According to research conducted by Baticulon et al., 2021, adaptive coping mechanisms are related to teachers in the midst of the global pandemic. This would suggest that the coping processes between individuals may have a substantial impact on how people (i.e., teachers) react within difficult work settings. Nevertheless, there is little research to support these findings inside of an Alternatives Education System (ALS) context.

Previous studies indicate that Institutional and administrative support systems are also important in developing teacher resilience. Villaber (2023) mentioned strengthened administrative management, provision of instructional materials and frequent communication with mobile teachers as factors that increase instruction effectiveness and teacher flexibility. A similar observation was reported by Alviso and Tacadena (2023), who note that supported teachers' capacity to manage multiple learning centers and maintain quality of instruction despite limited resources gave rooms for them to perform. In contrast, a shortage of organizational support was associated with isolation and professional stress. These findings show that it is important to consider not only structural barriers but also how teachers are equipped to resist and negotiate them.

The way in which demographic variables affect people's experience of what they are faced with and how they handle it. Tachado and Tumarong (2024) observed differences between younger and more experienced teachers in adjusting to classroom needs and coping with the physical demands of multi-center transfers. Disparities in educational attainment may also affect instructional flexibility and pedagogical innovation. Notwithstanding these insights, the interaction among demographic characteristics, experienced challenges, coping strategies, and stress levels stay underexplored within

the ALS framework. Understanding these associations is vital for developing targeted interventions that recognize differences in teacher profiles and professional needs.

This study used an empirical quantitative correlational research design to evaluate the relationship(s) between the different challenge types that ALS teachers experience, the coping strategies utilized to deal with those challenges, the level of stress experienced by those teachers. Specifically, the study seeks to answer the following questions:

1. What is the level of instructional, learner-related, and resource-related challenges experienced by ALS teachers?

2. Are there significant differences in experienced challenges across demographic groups (age, teaching experience, and educational attainment)?

3. Is there a significant relationship between coping strategies experience, and perceived stress among ALS teachers?

In this manner, the analysis moves beyond merely describing systematics constraints and instead examines by moving outside the description and listing of systemic constraints alone to pay attention to how structural challenges are mediated in the lives of individuals, the analysis contributes a more robust framework for understanding teacher resilience in alternative education contexts. Results may be used to develop professional development, stress management and institutional interventions to increase both teacher wellness and instructional effectiveness. Lastly, strengthening support structures for ALS educators is imperative to preserving the program's larger purpose of promoting educational equity and social inclusivity in the Philippines.

Conceptual Framework

The Theory of Stress and Coping by Lazarus and Folkman (1984) forms a solid base for why and how individuals cope with the stressors they may face in life. Stress transaction model highlights the interaction between the individual and the environment, as it stresses the need to appraisal of stressors and search for coping strategies. Stress occurs when there is a perceived imbalance between the demands that the environment places on someone and the resources the individual possesses to meet those demands. The primary and secondary appraisal models as well as the related coping processes are at the core of this theory.

The theory groups coping strategies based on: a) those aimed at problem-solving (problem-focused), b) those aimed at alleviating the emotional experience (emotion-focused), c) mechanisms that steer individuals away from stressors (avoidance-focused), and it further summarizes more outward behaviors as seeking support. Problem-focused coping is taking direct steps to solve the problem, e.g., prioritizing what needs to be done, asking for solutions, or working on skills through feedback and training. These strategies fall under the umbrella of "modifying the environment to reduce stressors", as formulated by Lazarus and Folkman. Emotion-focused coping, on the other hand, seeks to manage the emotional reactions to stress. Stay positive, practice relaxation techniques, and vent to trusted individuals (also examples). This strategy is informative especially when stressors are beyond one's control. While not suggested as a positive strategy explicitly by the theory, avoidance coping is noted as a common protective response. It involves behaviors like procrastination, distraction or emotional withdrawal, which are often considered maladaptive in the long term. Support-seeking coping, which is related to both problem-focused and emotion-focused strategies, entails reaching out to the social network for instrumental help or for emotional support. The key is leveraging social resources to cope with stress.

It aligns itself with the transactional model and addresses the reciprocal relationship between personal appraisal factor and environmental factor. The Perceived Stress Scale (PSS) also reflects this approach as it emphasizes individual perceptions and responses to stress. The scale explores primary appraisals of stressors, like feeling overwhelmed by a multitude of tasks or having insufficient resources to confront challenges. It further covers secondary appraisals, which assess the existence of coping resources, including institutional support and professional development resources. Also included are emotional and physical stress response, which can involve emotional states like feeling drained or physical reactions like headaches or fatigue. In addition, the PSS describes the impact of stress, including impaired teaching performance and poor work-life balance.

Other theoretical frameworks that add on to Lazarus and Folkman's model include One is known as the Job Demands-Resources (JD-R) Model differentiating between job demands (stressors) and job resources (stress-reducing factors). This is consistent with any standards, like the PSS, that emphasize adequate support systems and professional development opportunities.

Adding further dimension, Self-Determination Theory (SDT) provides insight through consideration of psychological needs such as competence, relatedness, and autonomy, seen in items relating to motivation and skill development.

Through the incorporation of these theoretical anchors, the conceptual framework acknowledges the complexity of stress and coping experienced by ALS teachers. It highlights the vital influence of the appraisal process, coping strategies, and the resources at hand on stress and its eventual consequences. Such a multifaceted approach offers a deeper understanding of the specific pressures that teachers face, as well as the ways in which they cope with stress in a productive fashion.

2. Methods

Descriptive-correlational research design was employed in the study. This design was chosen as it appropriately responds to the study's aims of describing the challenges experienced by ALS teachers and exploring the relationships between their coping mechanisms and perceived levels of stress. With this methodology, the study not only reports on the problems the teachers faced on the ground, it also investigates correlations and differences between demographic variables.

The Pearson Correlation coefficient was utilized in the study to assess the relationship between the use of coping strategies and perceived stress levels among the respondents. Coping strategies were assessed with the validated Coping Strategies Inventory (CSI), which can evaluate different approaches individuals use to cope with stress. The perceived stress level was assessed using a questionnaire tool called Perceived Stress Scale (PSS), a widely accepted tool for measure of stress levels in different populations. The Pearson Correlation is calculated to evaluate the degree and direction of the relationship between the above-mentioned variables which explains how they affect the stress levels of ALS teachers. The findings help determine if effective coping can lessen stress's negative impact in their special teaching context.

Aside from correlating variables, the study also sought to determine the differences in the level of difficulties encountered by ALS teachers when grouped according to demographic factors like age, teaching experience, and educational attainment. A one-way Analysis of Variance (ANOVA) was used for this purpose. We used ANOVA, a powerful statistical method used to compare means between two or more groups. This data analysis enabled the researcher to identify if demographic factors had statistically relevant impact on perceived challenges, contextualizing how teacher experience was still different given the diversity of the population in the study.

Data for the study was collected through an online survey questionnaire which was posted through Google Forms. The questionnaire included sections inquiring about demographic characteristics, challenges faced by ALS teachers, their coping strategies using the CSI, and their stress levels using the PSS. The questionnaire is developed and validated for content and face validity. The study was made reliable through two means: first Cronbach's Alpha, which measures how close the items of a test are as a group, and second a test-retest method, the same measure being administered to a group of respondents at two different points in time. Both approaches validated that the research instruments used in the survey had high internal consistency and thus are appropriate for use in this research context.

The respondents of the survey are the 48 Junior High School teachers of the Department of Education's Alternative Learning System (ALS) program. The sample size may be small but enough for correlational research which aims to discover the relationships among multiple correlates within a single-group sample, like the ALS teachers. Cohen (1992) mentioned that for a moderate to large effect sizes of correlational experiments with $p < 0.05$, a priori from 27 to 47 respondents should attain acceptable statistical power to identify considerable relationships. Obtaining quantitative data through purposive sampling, this method allowed data collection from participants who are in a unique position to inform about challenges and coping strategies appropriate to the aim of the study. The small sample size was sufficient due to the specifics of the type of study being conducted, and the specific population under investigation. You are responsible for teaching out-of-school youth and adults, often in difficult situations that require ingenuity and resilience.

However, its techniques were systematically chosen to dovetail with its goals, guaranteeing the dependability and authenticity of the data gathering. Combinations of descriptive and correlational analyses, along with stringent validation of the measuring instrument, provide a big-picture view of not only the challenges faced by ALS teachers but also how these aforementioned factors help cope with those challenges. With an emphasis on informing policymakers and stakeholders about the

assistance required to support the health and effectiveness of these educators, the findings serve as a foundation for future policy and action.

3. Results

Table 1. Extent of Challenges Encountered by ALS Teachers

Challenges in Instructional Delivery	**Mean**	**SD**	**Interpretation**
I find it difficult to deliver lessons effectively due to limited instructional resources.	2.90	0.95	Neutral
The lack of access to technology hampers my ability to implement diverse teaching strategies.	3.00	0.97	Neutral
I face challenges adapting my teaching methods to accommodate learners with varying needs.	3.29	0.80	Neutral
Insufficient training opportunities hinder my ability to improve my instructional delivery.	2.71	0.99	Neutral
I struggle to maintain the quality of instruction in a non-traditional teaching setup (e.g., modular, blended).	2.96	0.94	Neutral
Grand Mean	2.97	0.93	Neutral
Challenges in Learner Engagement			
Many learners lack motivation, making it hard to engage them in lessons.	3.50	0.80	Agree
Irregular attendance of learners disrupts the teaching and learning process.	3.79	0.92	Agree
I find it challenging to build strong teacher-learner relationships in the ALS setup.	3.00	0.85	Neutral
Learners often struggle to complete assignments and tasks on time.	3.81	0.89	Agree
Limited communication tools affect my ability to interact effectively with learners.	3.04	0.85	Neutral
Grand Mean	3.43	0.87	Agree
Challenges in Resource Availability			
I lack access to adequate learning materials and teaching aids.	2.73	0.84	Neutral
Budget constraints prevent me from acquiring the necessary resources for teaching.	3.38	0.89	Neutral
There are insufficient facilities (e.g., classrooms, and learning spaces) to support effective instruction.	3.15	1.20	Neutral
Administrative support for addressing resource gaps is inadequate.	3.06	0.98	Neutral
I often have to use personal funds to supplement teaching materials or activities.	3.63	0.98	Agree
Grand Mean	3.19	0.98	Neutral

Table 1 summarizes the extent of challenges encountered by ALS teachers in terms of instructional delivery, learner engagement, and resource availability. Generally, in instructional delivery challenges with a mean score of 2.97, teachers neither strongly experience nor completely reject the existence of the challenges. This implies that the issue may happen occasionally but is not recognized as a constant or highly critical concern. ALS teachers might have adopted those situations (lack of technology) over time. It is also observed that lower variability in the scores was assigned by the respondents (SD = 0.98)

On the contrary, learner engagement was more of a problem with a mean score of 3.43. Mostly, ALS teachers agree on challenges they encountered in the learner engagement. More

specifically, ALS teachers agreed that learners often struggle to complete assignments and tasks on time. One contributing factor is the socio-economic status of the ALS learners, employed and with family, resulting in their splitting time to studying and earning a livelihood.

ALS teachers, neither strongly encounter nor completely decline resource availability challenges (M = 3.19). More specifically, ALS teachers agree that they often use personal funds to support teaching materials or activities. The "neutral" responses (4 out of 5 indicators) of ALS teachers indicate that they moderately experience resource-related challenges. While some restrictions on materials and facilities exist, these challenges may not be perceived as severe, probably because teachers have adjusted to the current situations within ALS setting.

Table 2. Variations in the Extent of Challenges Faced by ALS Teachers Across Demographic Groups

	F	F crit	P-Value
Age	2.2135	0.0834	2.5888
Gender	1.0435	0.3606	3.2043
Years of Teaching Experience	1.2193	0.3139	2.8165
Educational Attainment	3.6085	0.0486	3.2043

The data show that age, gender and years of teaching experience do not significantly influence the challenges experienced by the ALS teachers. However, a significant difference is observed when teachers are grouped in terms of their educational attainment ($p = 0.0486$). It only explains that the level of education may affect how ALS teachers manage the challenges associated with their work.

Table 3. Coping Strategies Inventory (CSI) for ALS Teachers

	Mean	SD	Interpretation
Problem-Focused Coping	4.15	0.83	Agree
I prioritize tasks and create a schedule to manage my workload.	4.06	0.84	Agree
I seek support from colleagues to solve work-related challenges.	3.83	1.02	Agree
I focus on finding solutions to problems rather than dwelling on them.	4.19	0.76	Agree
I actively participate in training or workshops to improve my teaching skills.	4.40	0.71	Strongly Agree
I use feedback from learners or supervisors to improve my teaching methods.	4.25	0.81	Strongly Agree
Emotion-Focused Coping	3.90	0.95	Agree
I talk to friends or family about my frustrations.	3.63	1.08	Agree
I engage in activities (e.g., hobbies, exercise) to reduce stress.	3.83	1.02	Agree
I practice relaxation techniques, such as deep breathing or meditation.	3.60	1.09	Agree
I try to stay optimistic and look for positive aspects in difficult situations.	4.31	0.75	Agree
I avoid dwelling on negative emotions and try to maintain emotional balance.	4.15	0.82	Agree
Avoidance Coping	3.37	1.12	Neutral
I put off dealing with difficult tasks until later.	3.25	1.04	Neutral
I distance myself emotionally from stressful situations.	3.77	0.90	Agree
I avoid discussing work challenges with others.	3.21	1.17	Neutral
I spend time on unrelated activities to distract myself	3.42	1.09	Agree

from stress.			
I rely on substances (e.g., caffeine, comfort food) to cope with stress.	3.21	1.40	Neutral
Support-Seeking Coping	3.91	0.99	Agree
I ask my supervisor for help when challenges arise.	3.73	1.16	Agree
I seek advice from experienced ALS teachers.	3.96	1.13	Agree
I join professional groups or forums to discuss teaching-related issues.	3.94	0.86	Agree
I collaborate with other teachers to share resources and strategies.	4.00	0.88	Agree
I attend peer-support meetings to address stress or challenges of teaching.	3.92	0.92	Agree

Table 3 presents the coping strategies employed by the ALS teachers. Overall, the results indicate that ALS teachers normally use problem-focused (M = 4.15) and support-seeking (M = 3.91) coping strategies, as mirrored by the "agree" interpretations in most (8 out of 10 indicators) items. In particular, ALS teachers actively participated in training and workshops to improve their teaching skills for them to cope up with the current challenges they encountered.

Avoidance coping has the least mean score (M = 3.37), signifying that ALS teachers manage to use this strategy less commonly compared to other coping strategies. The comparatively lower mean value for avoidance coping directs more hands-on methods in handling the weights of their work.

Table 4. Perceived Stress Scale (PSS) for ALS Teachers

	Mean	**SD**	**Interpretation**
Problem-Focused Coping	3.04	1.14	Neutral
I prioritize tasks and create a schedule to manage my workload.	3.40	0.98	Agree
I seek support from colleagues to solve work-related challenges.	2.92	1.11	Neutral
I focus on finding solutions to problems rather than dwelling on them.	2.90	1.19	Neutral
I actively participate in training or workshops to improve my teaching skills.	2.90	1.19	Neutral
I use feedback from learners or supervisors to improve my teaching methods.	3.10	1.21	Neutral
Emotion-Focused Coping	2.40	0.88	Disagree
I talk to friends or family about my frustrations.	2.46	0.92	Disagree
I engage in activities (e.g., hobbies, exercise) to reduce stress.	2.79	0.74	Neutral
I practice relaxation techniques, such as deep breathing or meditation.	2.15	0.95	Disagree
I try to stay optimistic and look for positive aspects in difficult situations.	2.25	0.89	Disagree
I avoid dwelling on negative emotions and try to maintain emotional balance.	2.33	0.91	Neutral
Avoidance Coping	2.74	1.14	Neutral
I put off dealing with difficult tasks until later.	3.15	0.99	Neutral
I distance myself emotionally from stressful situations.	2.81	1.07	Neutral
I avoid discussing work challenges with others.	2.67	1.19	Neutral

I spend time on unrelated activities to distract myself from stress.	2.52	1.24	Disagree
I rely on substances (e.g., caffeine, comfort food) to cope with stress.	2.54	1.22	Disagree
Support-Seeking Coping	2.85	0.94	Neutral
I ask my supervisor for help when challenges arise.	2.71	0.90	Neutral
I seek advice from experienced ALS teachers.	2.92	0.87	Neutral
I join professional groups or forums to discuss teaching-related issues.	2.73	0.92	Neutral
I collaborate with other teachers to share resources and strategies.	2.94	1.02	Neutral
I attend peer-support meetings to address stress or challenges of teaching.	2.94	1.00	Neutral

Table 4 summarizes the perceived stress by ALS teachers. The results reveal that with these several coping extents took “neutral”, suggesting that ALS teachers neither strongly experience nor entirely avoid the stressful circumstances defined in the items. Neutrality may entail that while teachers meeting certain stressors in their work, they are still able to handle them to a reasonable extent, resulting in stable responses rather than extreme agreement or disagreement. Among the indicators, the maximum mean score was achieved by prioritizing tasks and creating a schedule to manage workload (M = 3.40, agree). The result proposes that ALS teachers manage to count on task organization and time management as real-world strategies for handling the requirements of their work. However, the lowest mean score as reported for practicing relaxation techniques like deep breathing or mediation (M = 2.15). The result explains that ALS teachers may not usually involve in proper relaxation practices as an approach for handling stress.

4. Discussion

The findings of this study reveal that ALS teachers encounter a range of challenges across three core domains: instructional delivery, learner engagement, and resource availability. While the overall responses for instructional delivery and resource availability were interpreted as neutral, the data suggest that these issues – though not immediately critical – can have long-term implications for teaching effectiveness and learner success.

For instructional delivery, teachers expressed difficulties in adapting their strategies to meet diverse learner needs. This issue may stem from limited opportunities for professional training and a lack of adequate instructional materials. Although not seen as severe, these challenges could accumulate and negatively affect learning, especially for students with learning gaps or irregular schooling backgrounds. As highlighted by Villegas-Reimers (2003), the ability of teachers to meet varying learner needs is largely dependent on access to quality professional development.

Learner engagement emerged as the most significant challenge. Teachers observed that many learners show low motivation, irregular attendance, and a tendency to miss assignments. These patterns likely reflect broader socio-economic realities, such as poverty, family responsibilities, and the need to work. These barriers not only affect learner participation but also disrupt the continuity and quality of instruction. Campilla et al. (2023) noted that ALS learners are often burdened by economic and personal obligations, which take precedence over education.

Although resource availability received a neutral interpretation, concerns about insufficient teaching materials, inadequate budget support, and the need for teachers to shoulder expenses personally point to deeper systemic problems. These resource-related challenges, while often managed by teachers, create inequities and place a disproportionate burden on those working in under-resourced communities. Similar findings were reported in a study conducted in the Katima Circuit, where inadequate educational resources significantly affected instructional delivery and teacher morale (Sakuzita, 2021).

Despite these challenges, ALS teachers demonstrated strong commitment through their coping mechanisms. Problem-focused strategies, such as attending workshops and continuously improving teaching methods, were most commonly used. This reflects a proactive stance and a desire for growth and effectiveness. These findings are supported by Baticulon et al. (2021), who found that such strategies foster resilience among educators.

Teachers also made moderate use of emotion-focused and support-seeking coping strategies, relying on personal reflection and peer collaboration. Avoidance strategies were used less frequently, suggesting that teachers generally prefer to engage with, rather than escape from, their challenges. However, in prolonged high-stress situations, avoidance may become more common, highlighting the need for wellness programs and mental health support.

The analysis also showed that personal demographics such as age, gender, and years of teaching experience did not significantly affect the challenges teachers faced. However, educational attainment was found to be a relevant factor. Teachers with higher degrees appeared to handle instructional and resource-related challenges more effectively, likely due to stronger pedagogical and professional backgrounds. This reinforces the importance of providing advanced training opportunities for ALS educators at all levels.

5. Conclusion and Recommendations

The results reveal that ALS teachers face moderate challenges, especially in engagement of learners which affecting their quality of instruction. Although the most popular strategy is problem-focused, teachers also resort to emotion-focused and support-seeking coping to relieve stress. This has demonstrated a strong role of educational attainment in buffering against challenges, which highlights the need for professional development of ALS teachers. These results highlight the potential need for more tailored efforts to help ALS teachers address these challenges while also preserving program effectiveness.

The current research has limitations namely: the sample size; dependence on self-reported measures; and the research design. The sample size was limited only to 48 ALS teachers within a specified area. As a result, it may limit the applicability in broader contexts. The use of participants' responses may introduce response bias, specifically when respondents provide answers that match with socially desirable behaviors like coping practices. Depending on single-phase design restricts causal examination of relationships among challenges, coping strategies, and stress. Future studies may consider larger, multiple regional samples to improve generalizability. Time-series study could better examine how coping strategies grow over time to sustainable structural problems. Moreover, qualitative research design may produce deeper view into how teacher interpret "neutral" experiences of challenge, particularly in relation to institutional constraints within ALS.

Recommendations for Professional Development on Scale

The current study revealed that the most often used Adoptive Coping Strategies among ALS teachers are collaboration with the community and flexible teaching. These are evidence of strong soft skills and pedagogical adaptability. But in perception of the researchers, most difficult challenges are those identified by respondents, particularly limited instructional resources, multi-grade/multi-level teaching, and irregular attendance of learners, call out for specific professional competencies that are not now a part of the standard teacher training.

The following professional development targeting ALS teachers should concentrate on the following skills:

1. Differentiated instruction and multi-level classroom management (Tomlinson, 2017) to cater for the heterogeneity of students in ALS contexts.
2. Resourceful pedagogy and low-cost material development, enabling teachers to develop context-specific learning materials without textbooks or ICT resources.
3. Community based education and stakeholder commitment training to prepare teachers in establishing stronger dealings with barangays, parents and NGOs, which is necessary to encouraging attendance and support for learners.
4. Psychological first aid and mental health knowledge, given that teachers may play the role of counselor for students feeling stress from the situations of their lives (Tanaka et al., 2020).

They have implications not only for teaching efficacy, but also for decreasing burnout and retaining teachers in resource poor settings.

Policy Implications for the Results

Although the paper already highlighted the need for systemic support, it goes a step further to propose that the Department of Education (DepEd) and other parties should focus on:

Establishing permanent centers for ALS learning to sustain and simplify the logistics.

– Uniform distribution of IMs and teacher kits for ALS facilitators including those who

handle various barangays/center.

– Prompt disbursement and increment of teacher allowances and travel funds in order to alleviate financial hardship and facilitate more effective outreach work.

– Integration of ALS-specific course modules in teacher education programs, or the creation of a certification course for non-formal education contexts.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 50-65
DOI: 10.13187/ejced.2026.1.50
https://ejce.cherkasgu.press

Practical Use of Language in the Workplace Environment. Flexible vs. Inflexible Delivery

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Abstract

A business environment is regarded as a space where people usually engage in intercultural communication where diverse linguistic and/or cultural interactions take place. That gave rise to the interest and research in "English as a Business Lingua Franca" and it has become a well-established phenomenon worldwide, but it has just recently become a topic of interest in Bosnia and Herzegovina. Therefore, this study aims to investigate BELF as a neutral communication code, in addition to building rapport, managing cultural and linguistic differences, and identifying business and linguistic skills that affect the day-to-day IT work environment. The qualitative research method was used to collect data through 11 interviews from IT companies in Bosnia and Herzegovina using a snowball sampling method. The results indicate that BELF is used as a neutral communication code without which business would be impossible to conduct, and also as a medium for various intercultural interactions, considering the limitations of the study. Even though it is difficult to make generalizations, and additional either quantitative or mixed research has to be done, the findings of this study can be beneficial to IT companies, educators, and intercultural researchers, especially in terms of maintaining effective communication, providing high-quality feedback, and building rapport.

Keywords: BELF, multicultural background, intercultural communication, IT context, Bosnia and Herzegovina.

1. Introduction

Globalization has reshaped the perception of English, transitioning it from a foreign language to a lingua franca, emphasizing its pragmatic features over traditional fluency (Jenkins et al., 2011; Seidlhofer, 2011). ELF originated from Larry Smith's (1983) work on English in diverse global contexts and Knapp's (1987) coining of the term 'English as an international lingua franca'. ELF

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challenges the idea of native-like proficiency as the only standard, and highlights the role of non-native speakers as the sole standard and emphasizes the role of non-native speakers in shaping global English varieties (Jenkins, 2009; Jenkins, 2014). It is perceived as either a communication tool for people from different linguistic backgrounds (Seidlhofer, 2011), or the language of choice (Jenkins, 2009: 200). These interactions nurture diverse discursive structures, including common topics, cooperative overlap, and code-switching, reflecting the dynamic use of language (Meierkord, 2002; Cogo, 2009; Jenkins, 2015). The growing interest in contextualized learning strategies and negotiation in communication has led to specific adaptations of ELF, such as BELF (Canagarajah, 2007).

BELF, as opposed to ELF, is used by diverse speakers for business purposes. It does not require a standardized use of language. Professional knowledge, cultural background, level of proficiency, ability to express thoughts, organizational skills, and interpersonal relationships affect BELF interactions (Chen, 2021). In BELF interactions, conveying information takes precedence over linguistic proficiency, underscoring the focus on communicative effectiveness (Chen, 2021). Nevertheless, achieving communicative goals and establishing mutual understanding are just two defining principles. BELF also envelops both rapport and conflict management (Knapp, 2011). BELF functions as a shared code for business, emphasizing its hybrid, adaptable nature and importance in the global market (Louhiala-Salminen et al., 2005; Ammon, 2008). It is a neutral communication code in a pool of different cultural and linguistic experiences (Dedović-Atilla, Dubravac, 2022). That being said, no one can take ownership of English, and it should not be attached to a single culture. Neither native nor non-native speakers dominate its language use, but every speaker is an equal user adapting their communication styles to match the styles of the interlocutors (Dedović-Atilla, Dubravac, 2022), ultimately achieving effective communication. It is essential in any workplace, but it is particularly important in the IT industry, where technical language is commonly used in addition to BELF, and sometimes being more important than technical skills (Boyatzis, McKee, 2005; Thanky, 2012). Research (Ammon, 2008a; Boyatzis, McKee, 2005; Holmes, Marra, 2004; Langley, 2013; Thanky, 2012) has shown that poor communication can lead to missed deadlines and decreased job satisfaction among employees, causing project delays and failures. To avoid that, language use should reflect one's goal to find the common ground or intercultural space (Kecskes, 2014). Kecskes (2014) corroborates that pragmatic purposes are worth exploring, encompassing the elements of success and failure.

Based on this research, the study aims to investigate several features of BELF and their application in the IT business to provide insight into the use of language, building rapport, development of business and language skills in a culturally and linguistically diverse setting, potentially affecting the educational practices and policies in Bosnia and Herzegovina. They correspond to the hypotheses posed for the research:

H1: BELF is regarded as a neutral communication tool in the IT context.

H2: BELF is used to help build rapport with the employees, facilitating day-to-day interaction.

H3: BELF proves that getting the message across is more important than having proficient language skills.

H4: BELF allows employees from different linguistic and cultural backgrounds to use English to communicate with each other in an IT context.

2. Literature review

In the IT industry, there is a need to solve complex issues employing both innovative and already existing strategies. Some of them include BELF strategies since they facilitate communication between workers and provide clarity and understanding, build trust, value diversity among team members, and promote productivity and efficiency (Gudykunst, 2017; Oh et al., 2021). Defining features, like BELF being a neutral communication code, building rapport, linguistic and business skills, and intercultural exposure, will be explored in order to realize in what ways they foster collaboration, promote innovation, and affect success factors.

Investigating the use of BELF as a neutral communication code and the use of English, studies done in Sweden and Finland (Charles, Marschan-Piekkari, 2002; Kankaanranta, Planken, 2010; Louhiala-Salminen et al., 2005; Mauranen, 2012), Germany (Ehrenreich, 2010), and many other countries have indicated that both native and non-native speakers face communication issues in the international business environment. BELF principles were investigated and incorporated in

the context. It was indicated that English is an integral part of international business, a neutral shared code, and not a separate entity. The proper use of English should not be the ultimate goal, but the successful completion of tasks. Research indicates that prolonged use of simplified language may lead to disempowerment and stagnation for individuals (Takino, 2017). Nevertheless, as a code, BELF appears to be a hybrid and simple communication system without which international business would be almost impossible to conduct (Jenkins, 2015; Mauranen, 2012; Seidlhofer, 2011). Overall, the most important thing is making sure everyone understands what is being said (Ran, Yang, 2015), since it directly affects and facilitates communication among international team members. Many of these studies (Jenkins, 2015; Mauranen, 2012; Seidlhofer, 2011) offer suggestions to promote BELF use through training sessions. Also, establishing and maintaining business relationships within the business community poses additional challenges.

In order to understand the challenges and the ways they can be overcome within the BELF IT context, several principles were investigated through various studies, for instance, Firth (1996), Komori-Glatz (2017), Nikko (2009), Poncini (2007), Pullin (2010), and others. Introducing the "let-it-pass" and corporate "we" is found to promote supportive use of language, encouraging collaboration from employees (Firth, 1996; Poncini, 2007). Teamwork and active communication are expected to help BELF speakers handle challenging tasks (Nikko, 2009). Including small talk in the everyday work environment is said to build relationships and strengthen trust among colleagues, developing a sense of solidarity in spite of differences in languages and cultures, and also playing a major role in repairing and maintaining relationships (Pullin, 2010). The research (Komori-Glatz, 2017; Nikko, 2009; Pullin, 2010) suggests that it is far more important to be understood in a shared BELF space through the strategies that promote effective communication, building rapport, and small-talk-supported work-related discussions. Incorporating these principles is believed to improve the overall efficacy, understanding and productivity during and after working hours; and BELF users cannot apply these principles without language and business skills. However, there is a significant concern that this approach may marginalize employees, particularly those who prefer to articulate their ideas using a more sophisticated or nuanced language (Gunnarsson et al., 2014).

The language and business skills are specific in BELF interactions. Looking into the studies (Birlik, Kaur, 2020; Chen, 2021; Cogo, House, 2018; House, 2013; Kankaanranta, Planken, 2010; Mauranen, 2012; Murray, 2012; Seidlhofer, 2011), there are several interesting findings worth mentioning. In the business environment, there are either task-oriented or content-oriented interactions (Chen, 2021), allowing their users to co-construct the information (House, 2013). BELF has an important purpose; it serves as a bridge between the user's skills and business demands. Of course, there is a higher risk of conflict if these demands are not met, and international companies are advised to use explicit strategies to clarify what is being said and done (Cogo, House, 2018; Murray, 2012). Mauranen (2012) explained that employees should resort to using simplified forms of English, focusing more on solutions. Understanding non-verbal cues is said to be one of the many integral business skills (Birlik, Kaur, 2020; Räisänen, 2020), others being problem-solving skills, collaboration, and empathy (House, 2013; Kankaanranta, Planken, 2010; Mauranen, 2012; Murray, 2012; Seidlhofer, 2011). Limited access to high-quality English language instruction and resources may put individuals at a disadvantage in terms of career progression (Gunnarsson et al., 2014). Ultimately, success factors depend on maintaining effective communication (Kankaanranta, Planken, 2010; Seidlhofer, 2011), and they include both business and language skills, increasing the chance of doing business professionally, effectively, and profitably in a culturally diverse environment.

It is evident that in trying to conduct international business, people from various cultural and linguistic backgrounds will come in contact with each other. Exploration of the linguistic and cultural milieu in the BELF context was done through several studies (Chen, 2021; Jenkins, 2007; Jenkins, 2009; Kankaanranta, Lu, 2013; Kecskes, 2014; Seidlhofer, 2011). It is confirmed that BELF is either a communication tool for people from different linguistic backgrounds (Seidlhofer, 2011) or the language of choice (Jenkins, 2009: 200). The multicultural challenges and interactions occur in cultural and social situations (Kankaanranta, Lu, 2013). When exposed to them, both parties strive to achieve a win-win outcome (Kecskes, 2014). Accents may pose major challenges (Chen, 2021). If successful interaction is the goal, one should show empathy, create a shared space, and exude openness to solve problems (Jenkins, 2007; Jenkins, 2009; Seidlhofer, 2011).

Additionally, several studies have explored various aspects of the business environment and BELF in Bosnia and Herzegovina and neighboring countries, for instance, Dedović-Atilla and Dubravac (2022), Palalić et al. (2016), Petričević and Danis (2007), and Travica et al. (2007), leading to several noteworthy conclusions. The first is the importance of understanding political, social, and economic factors that are closely tied to the target country, as these shape business legacies (Petričević, Danis, 2007). The second is that BELF-related research can be influenced by entrepreneurial conditions and educational limitations (Palalić et al., 2016; Travica et al., 2007). The third highlights the recognition that English holds equal importance to the local mother tongue(s) in Bosnia and Herzegovina, being flexibly adapted across different professional environments (Dedović-Atilla, Dubravac, 2022). These studies provide valuable insight into conducting business, the use of BELF, and making informed decisions. However, there is a clear gap in the regional IT context, which can provide valuable insights. Therefore, four research questions are posed to be answered:

1. Can BELF be regarded as a neutral communication tool in IT context?
2. Is BELF used to help build rapport with the employees facilitating day-to-day interaction?
3. What business and language skills are essential to conduct business?
4. How do employees from different linguistic and cultural backgrounds use English to communicate effectively in an IT business context?

3. Methodology

Participants

To collect data, the interviews were conducted in English using an online platform, more specifically Google Meet. The meetings were scheduled by including the participants' emails. The interviews were recorded, and the recordings were transcribed and coded for the analysis. The answers were contextualized. The participants provided their contact information in case the scholar needed additional answers. Beforehand, the participants signed the consent form, and provided verbal confirmation at the beginning of the interview. This ensured that ethical considerations were met, and the participants were fully informed of the research objectives and how their responses would be used. Eleven participants were included in the research through the snowball sampling method. Four participants were found on LinkedIn after which they were contacted in order to schedule meetings. During the interviews they mentioned other people that are a good fit and shared their contact information. The scholar contacted them and the process was repeated in the same manner. Snowball sampling was chosen due to its effectiveness in reaching a diverse range of participants within the Bosnian IT industry, particularly those with specific roles and experiences that are otherwise hard to access. Alternative sampling methods were not feasible due to the difficulty of identifying and accessing a sufficiently targeted population within this specific industry context. However, it is important to note that snowball sampling may introduce bias, as participants tend to refer to individuals within their own networks, potentially limiting the diversity of perspectives.

The participants were selected based on a variety of criteria including assigned roles and years of experience, allowing the researcher to gather a diverse range of perspectives and effectively address the research questions at hand.

Data Analysis

The research questions were identified and the qualitative methodology was chosen as it allowed conducting an in-depth analysis and exploring participants' experiences. This research is valuable as it offers detailed and contextualized subjective experiences related to key aspects of English as a Business Lingua Franca (BELF). These insights will aid scholars in identifying motivators, attitudes, and behaviors associated with the IT context, including software development, digital communication, and network infrastructure. The instrument of the research is the interview, and it was constructed on the basis of the research done by Dedovic-Atilla and Dubravac (2022). The informants were given the interview protocol in advance. There were three groups of questions in the instrument. The first part consisted of general questions that provided rich and detailed background information about the participants. The second part consisted of open-ended questions, from background learning experience, level of English required to do tasks, evaluation process, important language and business skills, language(s) used in the process, problems and solutions. And the final part was an opportunity for the participants to add any

additional comments, suggestions and remarks. Additionally, the data were analyzed using thematic analysis, following a deductive theory-based approach (Braun, Clarke, 2006). This approach was chosen because the study aimed to examine participants' experiences in contrast to predefined BELF constructs, i.e. BELF as a neutral communication code, rapport building, communicative effectiveness and intercultural adaptability (Kankaanranta, Planken, 2010; Seidlhofer, 2011; Dedović-Atilla, Dubravac, 2022). The interviews were transcribed, coded by identifying units relevant to the research questions. The codes were grouped into broader themes corresponding to the theoretical framework.

4. Results

Detailed information about the participants is presented in Tables 1, 2, Table 1 containing general information about the participants, and Table 2 information about the experience, self-assessment and context of learning English.

Table 1. General information

	Position	Gender	Age	Citizenship	Level of education	Nature of business
Participant 1	Supervisor	Female	30-39	Bosnian	BA	Manufacturing Services Trading Finance Other: PM
Participant 2	Employee	Male	30-39	Bosnian	MA	QA
Participant 3	Supervisor	Female	18-29	Bosnian	BA	Manufacturing Services Trading Finance Other: HR
Participant 4	Supervisor	Male	30-39	Bosnian	BA	Senior Web Developer, Tech Lead
Participant 5	Employee	Female	30-39	Bosnian	MA	Frontend Developer
Participant 6	Employee	Female	30-39	Bosnian	MA	Tutor
Participant 7	Supervisor	Male	30-39	Bosnian	High School	Senior Devops Engineer, Tech Lead
Participant 8	Supervisor	Male	40-49	Bosnian	High School	Developer, Manager, HR – Head
Participant 9	Employee	Female	18-29	Bosnian	BA	QA
Participant 10	Supervisor	Male	30-39	Bosnian	BA	Studio Manager, Technical Director
Participant 11	Employee	Female	30-39	Bosnian	MA	Software Developer

Table 2. Experience

	Total years of experience	How would you assess your knowledge of English?	Where did you learn English (more than one answer is possible)?	Do you own an official English certificate/diploma paper?
Participant 1	6	Very good	School Self-study Other: job	NO

	Total years of experience	How would you assess your knowledge of English?	Where did you learn English (more than one answer is possible)?	Do you own an official English certificate/diploma paper?
Participant 2	8	Very good or good	School English course	NO
Participant 3	4	Good	School Media Other: Faculty or job	NO
Participant 4	8	Very good	School English course Media Self-study Other: games and podcasts	YES B1 B2
Participant 5	8	Very good	School	NO
Participant 6	6	Excellent	School English course Media Self-study	NO
Participant 7	13	Excellent	School Media Other: software and gaming	NO
Participant 8	20	Excellent	School English course Media Self-study Other: movies, books and podcasts	NO
Participant 9	3	Good	School English Course Meda Other: books and music	YES A1 A2
Participant 10	11	Excellent	Media Other: video games, movies, TV and online communication	NO
Participant 11	7	Good	Media Other: TV shows, podcasts, videos	YES B1

Table 3. Categories, subcategories, and illustrative excerpts from the interviews

Category	Subcategory	Illustrative statement
BELF as a neutral communication code	Communicative effectiveness over accuracy	*"Language skills help you UNDERSTAND each other, (2.0) but you have to know the SIMPLE vocabulary."* (Participant 11)
	Conversational English as BELF	*"***I would say I use English more often than Bosnian. The official language at company is English. (1.0) Every message I write, every document, whatever,*

Category	Subcategory	Illustrative statement
		every email, day-to-day communication is always English. It's always in English. Only, at the office, when you talk to colleagues, then you will use our native language." (Participant 4)
Rapport building	Active listening and feedback	"*Sometimes people just listen to answer the questions. (5.0) And in this line of work, it is not enough. The perception influences how the message is understood. It can create lots of misunderstandings.*" (Participant 6)
	Psychological safety	"**** You need to know how to approach the candidate and make them feel safe. You don't want them to be nervous, threatened and all of that. *** You don't leave anything to chance.*" (Participant 5)
Business and language skills	Role-dependent language demands	"**** It depends on the position and how important English is. For instance, (3.0) developers or QAs are not people who need proficient skills. They need me to be clear. (2.0) As opposed to the PM, who is a shield between the client and the developer, they have to have PROFICIENT language skills.*" (Participant 9)
	Soft skills as core competencies	"*Well, like I said, it depends on the role. For basic, engineer role, OKAY I mean, you are looking for people who are good teammates. (2.0) You have to think about whether they will be insulted with certain things, improve their knowledge and raise lots of conflicts in the company itself. For client facing and managerial role, I would say you need to be a psychologist. You really need to know what to expect from the people and how do you approach them and how do you communicate certain things which are not necessarily positive, how big of an impact will that be and what you can expect in return and all of that. I would say soft skills definitely, but also you need to have a different understanding of human psychology.*" (Participant 5)
Intercultural communication	Accent accomodation	"*Some accents (4.0), like THE INDIAN ACCENT, are DIFFICULT to understand. You have to ask to repeat or in some cases to write it down. Yeah! (4.0)*" (Participant 11)
	Adaptation strategies	"**** Things are international and regional. Like, (2.0) you have people from Macedonia and Serbian, Bosnian. Usually, we are talking in Bosnian because everybody understand it. But there are certain situations where, so sorry if I am going away from the topic, so lets say people in Macedonia, they do understand Bosnian and some of them can answer in Bosnian and it would sound okay. (2.0) But ((verbal filler)) some of them will answer in Macedonian, sometimes it is okay and you can talk in Bosnian and sometimes you really need them to switch to English if you really want the details there. Mostly, we do catch the concepts and what they are really trying to say but sometimes we get lost in translation. In other teams, we do have companies that are working from Romania and obviously in that situation, even if it is an internal meeting you would be talking in English.*" (Participant 5)

The data was analyzed as non-numerical information, focusing on the experiences of the participants. After recording and transcribing the interviews, the data was organized and coded to identify key themes and concepts using a deductive approach. The conclusions were interpreted in relation to the research questions, providing insights into the existing phenomenon.

Can BELF be regarded as a neutral communication tool in IT context?

The results showed that all the participants, regardless of their age, gender, or position, emphasized the importance of using English as a neutral code promoting understanding and effective communication, and indicated that, while language proficiency is good to have, the primary goal is to ensure clear communication and successful exchange of information. It is consistent with prior research findings that suggest English is not isolated, but rather serves as a common language essential for business operations (Charles, Marschan-Piekkari, 2002; Kankaanranta, Planken, 2010; Louhiala-Salminen et al., 2005; Mauranen, 2012), including in Germany (Ehrenreich, 2010).

One of the participants said:

"*Language skills help you UNDERSTAND each other, (2.0) but you have to know the SIMPLE vocabulary.*" (Participant 11)

English is used as a primary mode of communication, additionally labeled under the umbrella term of language skills:

"*To be honest ((higher pitch)), I think it is essential to have good language skills. Even though we don't know business-specific vocabulary, we can explain it in terms we do know if we have language skills.*" (Participant 7)

Achieving success in a diverse work environment relies on effectively applying intercultural communication skills; and, by prioritizing tasks and employing a blend of business and neutral language, individuals can enhance the efficacy and success of their professional interactions (Kankaanranta, Planken, 2010; Seidlhofer, 2011). Similarly, this part of the research highlights the importance of prioritizing task completion over striving for native-like proficiency:

"*(5.0) If you own your own company, of course ENGLISH is important. In some cases, (1.0) you can hire a person to conduct business for you. But (5.0) for you personally, (1.0) you have to remember that not even our clients are proficient.*" (Participant 11)

The results also indicate that being able to comprehend, interpret, and express language in a specific context is what matters. Without English, business would be impossible to conduct:

"****I cannot IMAGINE ANY team member WHO can work effectively without conversational English skills.*" (Participant 2)

The goal is not to be grammatically correct because most of the employees are not familiar with grammar points, even in their own native language(s). The BELF use is linked to conversational English. English is sometimes used more often than native language(s):

"****I would say I use English more often than Bosnian. The official language at company is English. (1.0) Every message I write, every document, whatever, every email, day-to-day communication is always English. It's always in English. Only, at the office, when you talk to colleagues, then you will use our native language.*" (Participant 4)

To answer the first research question, BELF can be regarded as a neutral communication tool based on the results that all the participants recognized the importance of its use, emphasizing the primary objective — ensuring clear communication and successful exchange of information. Being grammatically correct is not as important as being understood. Only the participants in leadership positions believe that fluency holds greater significance. The study also established a connection between BELF use and conversational English. These contributions enhance our comprehension of the practical uses of Business English as a Lingua Franca (BELF) and its impact on intercultural communication within organizational settings.

Is BELF used to help build rapport with the employees facilitating day-to-day interaction?

The results show that all the participants recognize the value in maintaining good relationships with their clients and colleagues. Having good communication skills is what enables them to express themselves and ensure they maintain a healthy and mutual understanding. All the team members have to be familiar with the projects and requirements, and that essentially builds rapport. Active listening was highlighted as a crucial skill, as Participant 6 explained:

"*Sometimes people just listen to answer the questions. (5.0) And in this line of work, it is not enough. The perception influences how the message is understood. It can create lots of misunderstandings.*" (Participant 6)

The participants indicate that the role and responsibilities within the team structure contribute to building and maintaining rapport. Some even stress that they need to be familiar with the human psyche in order to recognize when and how to approach someone. One participant explained it in detail:

"*Well, like I said, it depends on the role. For basic, engineer role, OKAY I mean, you are looking for people who are good teammates. (2.0) You have to think about whether they will be insulted with certain things, improve their knowledge and raise lots of conflicts in the company itself. For client facing and managerial role, I would say you need to be a psychologist. You really need to know what to expect from the people and how do you approach them and how do you communicate certain things which are not necessarily positive, how big of an impact will that be and what you can expect in return and all of that. I would say soft skills definitely, but also you need to have a different understanding of human psychology. *** You need to know how to approach the candidate and make them feel safe. You don't want them to be nervous, threatened and all of that. *** You don't leave anything to chance.*" (Participant 5)

In IT companies, both the employees and supervisors receive feedback at least twice a year, because the results indicate that it helps them foster strong relationships. Many participants explain that receiving feedback is a challenge in itself since it is not an easy thing to process. The HR workers are expected to do their due diligence and design a step-by-step process while dealing with some misunderstandings:

"*What we do is sit down. The best solution is to actually sit down with that person, communicate transparently give and receive feedback and listen. And try to find the common ground with that person and try to improve that. ****" (Participant 4)

The results also indicate that showing appreciation strengthens relationships, creating a positive work environment. Overall, the study found that all the participants recognized the importance of maintaining good relationships. Effective communication, familiarity with the project requirements, understanding roles and responsibilities, providing feedback, and showing appreciation help build rapport. Since English is used daily, BELF serves as a communication tool that helps them achieve these goals.

What business and language skills are essential to conduct business?

The results indicate that business skills are conditioned by the job description. For developers and QAs, business skills are intertwined with technical skills. For PMs, management skills are essential for overseeing the successful execution of projects, including planning, organizing, and overseeing. For HR workers, business skills are linked to both managerial and soft skills. For tutors, business skills are encompassed with the language and soft skills:

"**** It depends on the position and how important English is. For instance, (3.0) developers or QAs are not people who need proficient skills. They need me to be clear. (2.0) As opposed to the PM, who is a shield between the client and the developer, they have to have PROFICIENT language skills.*" (Participant 9)

All of them agree that soft skills are essential for every role, which include communication skills, collaboration, adaptability, flexibility, time management, problem solving, conflict resolution, active listening, and emotional intelligence:

"*REALLY, communication skills. The most important soft skills. Especially in IT.*" (Participant 5)

Lots of issues happen because of the lack of these skills and individual experiences:

"*THE PERCEPTION influences how the message is understood. It can create lots of misunderstandings.*" (Participant 6)

Personality types can also create issues within the IT context, as indicated in the following example:

"*(2.0) I would like to mention one example↑, one of my colleagues. He is always quiet at the meetings↑, even when directly asked. (4.0) Last time, our PM asked him something and he dropped the call. (4.0) At first, I thought he was afraid to talk in English. It seems he is afraid to speak in some cases. (4.0) I had a chance to hear him and his English is excellent. I was very surprised when I heard how fluent he is. We have the same role, when someone asks him something directly, he keeps quiet. I have answered for him. When I heard him I was confused*

because his English is much better than mine. (2.0) I am not sure what the PROBLEM IS. It is not always English that is the problem but soft skills." (Participant 1)

On the language skills spectrum, the results indicate that all the participants agree they have to be familiar with the job requirements, including the language expectations. Technical knowledge for some roles, like developers, is crucial for understanding products and services. Communication skills can be divided into written and spoken language. The participants explain that they have to maintain formal language while writing emails, whereas when they use Slack, they are more likely to be informal. It is easier for them to express themselves in written form since they use many tools and apps to make sure they get the messages across:

"*At first, I TRY TO SUMMARIZE IT t in our language and then I put them in Google Translate. As you know, (5.0) it is not 100 % correct, and then I modify the content. And if some phrases sound strange, (2.0) I google them and figure out what they mean. Lately, as there are lots of apps available, I write to them to have it write it more PROFESSIONALLY. But in some cases it sounds too professional.*" (Participant 1)

Expressing themselves in speech, e.g., meetings, presentations, workshops, and the company's parties, is far more challenging because they rely on their competencies and subjective and/or objective factors. Participant 11 shared that she experiences language anxiety when asked to express herself, even during brief meetings, affecting both her business and language skills.

Additionally, both in written and spoken form, native-like proficiency is valued, but the primary aim is to ensure clear communication and successful exchange of information:

"*HAVING GOOD LANGUAGE SKILLS, because, (5.0) for me, (3.0) the most important thing is to have them in order to think and talk in that language not only in business context but also privately*."(Participant 1)

The results show that what they mean by speaking skills is communication skills, active listening, and using understandable language. When asked what is more important, either to know the technical terms or to get the message across, all of them agreed that the latter one is far more important, even if it means adapting one's language skills to the level of proficiency of the interlocutors. The participants tend to be informal while communicating with other employees. However, they are expected to be formal with the supervisors. When issues happen, open communication and asking to clarify the message helps. All in all, the study found that business skills vary depending on the job description. Soft skills are essential for all roles. Personality traits may affect performance within the IT context. Language skills are important, and they reflect their business skills. Formal language is expected in more formal situations, while informal language is more common when communicating with colleagues. The results indicate that both language and business skills are important to conduct business successfully.

How do employees from different linguistic and cultural backgrounds use English to communicate effectively in an IT business context?

The results indicate that IT workers are expected to be exposed to people from different backgrounds:

"*** *It is implied.* ***" (Participant 2)

They report using two languages:

"*(2.0) In my group, we are all from Bosnia and we talk in OUR MOTHER TONGUE. OR if we have any daily or monthly conversations from our colleagues from Cyprus,(2.0) we communicate in English. (2.0) Yeah.*" (Participant 10)

However, that does not have to be the case since they cooperate with colleagues internationally:

"*** *Things are international and regional. Like, (2.0) you have people from Macedonia and Serbian, Bosnian. Usually, we are talking in Bosnian because everybody understand it. But there are certain situations where, so sorry if I am going away from the topic, so let's say people in Macedonia, they do understand Bosnian and some of them can answer in Bosnian and it would sound okay. (2.0) But ((verbal filler)) some of them will answer in Macedonian, sometimes it is okay and you can talk in Bosnian and sometimes you really need them to switch to English if you really want the details there. Mostly, we do catch the concepts and what they are really trying to say but sometimes we get lost in translation. In other teams, we do have companies that are working from Romania and obviously in that situation, even if it is an internal meeting you would be talking in English.*" (Participant 5)

They are exposed to wide variety of accents:

"*Some accents (4.0), like THE INDIAN ACCENT, are DIFFICULT to understand. You have to ask to repeat or in some cases to write it down. Yeah! (4.0)*" (Participant 11)

BELF allows them to adapt their language needs to the needs of the interlocutors, using simplified terms and avoiding idiomatic expressions. What is essential is to be goal-oriented, one of the many strategies that helps them achieve a win-win situation. BELF helps them express openness and empathy when dealing with different linguistic and cultural challenges. Based on the results, it is clear that IT workers are exposed to people from different cultural and linguistic backgrounds. They may not be required to possess native-like proficiency. The primary goal is effective and clear communication. BELF helps them adapt to different linguistic needs and challenges. They need to be flexible in the choice of their communication style in this line of work.

5. Discussion

The research indicated that BELF serves as a neutral communication tool within the IT context, except for participants in managerial roles. Looking into the studies (Kankaanranta, Planken, 2010; Louhiala-Salminen et al., 2005; Louhiala-Salminen, Kankaanranta, 2012), similar results were indicated. BELF was most frequently used as a hybrid and simplified tool in meetings and in emails, to achieve communicative goals based on specific linguistic requirements, ultimately reaching an international audience (Kankaanranta, Planken, 2010; Louhiala-Salminen et al., 2005; Louhiala-Salminen, Kankaanranta, 2012).

The study indicated that building rapport is essential for doing business, fostering healthy and mutually beneficial relationships, and sustaining high levels of productivity. Similar conclusions were reached in the studies (Biedenbach et al., 2011; Gabbert et al., 2021; Jenner, Myers, 2019), emphasizing that both role ambiguity and workload can have negative effects on rapport and equity, and that positive interaction is maintained through genuine rapport (Biedenbach et al., 2011; Gabbert et al., 2021; Jenner, Myers, 2019).

The study revealed that communication skills, active listening, and the ability to adapt language use are essential in the IT context. Similar conclusions and consequences were found in several studies (Chiswick, Miller, 2002; Mazer et al., 2007), indicating that the lack of these skills may result in diminished confidence, difficulty understanding interlocutors, and reluctance to speak up in meetings. Studies (Benner, Tushman, 2003; Ceci et al., 2014; Goel, Kathuria, 2010) confirmed the findings that effective communication skills are critical in conducting successful business, and that using clear and concise language promotes productivity and competitiveness in the IT job market (Deardorff, 2006; Kankaanranta, Louhiala-Salminen, 2010; Royle, Laing, 2014b). Improving soft skills can help individuals overcome the language barrier, ensure clarity in information transmission, and lead to better relationships with colleagues and clients (Mazer et al., 2007; Royle, Laing, 2014b; Shah et al., 2017; Zhang et al., 2023).

The study showed that the use of BELF helps participants meet their communication needs by using simple terms and avoiding complex and idiomatic structures in multicultural settings, allowing them to achieve mutually beneficial outcomes. Studies (Fredriksson et al., 2006; Giles, Watson, 2013; Jenkins, 2011; Sampson, 2021) confirmed that intercultural awareness and being open to adapt to different communication styles are key factors in maintaining BELF interactions in business settings.

6. Conclusion

Based on the research findings, there are several conclusions to be pointed out. BELF is widely used in IT companies in Bosnia. The employees use the language daily in order to achieve both communicative and business goals, regardless of their native language(s). The study also found a connection between conversational English and BELF use, emphasizing that being understood is more important than being grammatically correct. The participants recognized the importance of building and maintaining strong relationships through effective communication, understanding roles and responsibilities, providing feedback, and showing appreciation. It also highlights that business skills vary depending on the job description, while soft skills are essential for all roles. Formal language is expected to be used in formal contexts, whereas informal language is used in everyday speech. The study emphasized the importance of effective communication and the ability to adapt to different cultural and linguistic situations. The choice of the communication style affects the success rate.

Limitations of the study should be taken into consideration. They include the inability to generalize conclusions, time constraints, the focus on only one country, and a small number of participants in one business sector. An additional limitation of this study includes the validity of the instrument. Although the interview procedure was constructed based on the research by Dedović-Atilla and Dubravac (2022) and was aligned with the theoretical framework, the instrument was not independently validated through pilot testing or formal reliability procedures. Although the research questions were theoretically grounded, the results could be affected as consistency and construct validity of the interview questions were not empirically verified. The recommendations for further research are to conduct either quantitative or mixed-method research to see the extent to which these features occur and the outcomes of these occurrences on a larger scale.

7. Acknowledgments

Acknowledgements, funding information, and declaration of competing interests have been removed for blind review.

8. Conflict of interests

The author declares that there were no financial interests or personal relationships that have influenced the research process presented in this paper.

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Appendix

INTERVIEW QUESTIONS

General questions

1. Position: Supervisor /employee
2. Gender:
3. Age: 18-29 30-39 40-49 50 and more
4. Citizenship:
5. Level of education:
6. Nature of business:
7. Total years of experience:
8. How would you assess your knowledge of English:

excellent very good good fair poor

9. Where did you learn English (more than one answer is possible):

School English course media self-study other:_____

10. Do you own an official English certificate/diploma paper: YES NO

If yes, which level: A1 A2 B1 B2 C1 C2

Interview questions

1. Describe your experience in learning English, from schooling until employment.
2. What level of English do employers require for tasks at work? (writing emails, delivering presentations, participating in meetings, reading reports)
3. What do employers think is the most important language skill? (reading, listening, speaking, writing)
4. Are you planning to improve your English skills in future?
5. What English language evaluation methods do employers often use when recruiting new staff? (interview in English, internal/external evaluation)
6. Did your educational background help you with the employment process?
7. What kinds of skills and knowledge does satisfactory English language proficiency imply at your workplace?
8. At your workplace, which language(s) do you use to communicate with your colleagues?
9. What kinds of English skills do you feel you and your colleagues at work lack?
10. What kind of challenges do you and other colleagues face when communicating in English among yourselves or with clients?
11. Is it important to be proficient in the English Language at your workplace?
12. Which one is more important at your workplace to conduct business successfully and why: knowledge of business-specific vocabulary or good language skills (speaking, writing, reading, listening)?
13. Which one is more important at your workplace to conduct business successfully and why: accuracy of language or accuracy of content? (I.e. Is it more important to have English competence like a native speaker or to get the message across?)
14. In your view, what kind of English is it important to use at your workplace?
15. How important is it to be proficient in the English Language in order to get a promotion at your workplace?
16. How often is English used at your workplace?
17. In your view, what is the best way to master English in order to successfully fit in the Bosnian business market? Was the course that the company provided beneficial for your professional progress? / (Does your workplace offer any kind of training or course for perfecting employees' English skills? If the answer is positive, could you provide more details?)
18. When encountering a problem at your workplace related to English, where do you find help?
19. In your opinion, what kind of textbooks should one use for learning English before entering your workplace?
20. According to your experience, how should English business courses be designed in order to best prepare future business professionals to enter Bosnian business market? Why?
21. Do you have any suggestions, comments or questions?

European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 66-75
DOI: 10.13187/ejced.2026.1.66
https://ejce.cherkasgu.press

Validation of the Critical Thinking Questionnaire (CThQ) in a Sample of Students from Vocational Secondary Schools in Slovakia

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Abstract

Critical thinking is a core priority of modern education, yet its effective support in schools continues to pose significant challenges. The aim of this study was to identify, through students' self-assessment, the attributes of critical thinking in which students would welcome teacher support during instruction. The study was conducted on a sample of 104 final-year students from Slovak vocational secondary schools, with the *Critical Thinking Questionnaire (CThQ)* as the primary data collection tool. The results indicate that students most frequently identify memory as a significant weakness, which may limit the development of higher-order critical thinking skills such as analysis, evaluation, and creation. Based on these findings, we recommend placing greater emphasis on supporting memory processes and linking them to the application of acquired knowledge in more complex cognitive operations. Furthermore, our analysis suggests that aligning students' and teachers' perceptions of learning needs represents a key factor for the effective development of critical thinking in the educational process.

Keywords: critical thinking, student support, memory, self-assessment, knowledge.

1. Introduction

In today's educational environment, developing critical thinking is one of the primary goals of school teaching and curricula. Critical thinking is the ability to objectively analyze information, evaluate its credibility, formulate independent conclusions, and create solutions based on evidence. Its development is essential not only for students' academic success but also for their future active participation in social and civic life (Facione, 2011). Well-developed critical thinking is necessary for

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young people to face the challenges of the 21st century, such as misinformation, societal polarization, and a rapidly changing job market (Abrami et al., 2015). Purposeful cultivation of these skills in education contributes to forming autonomous citizens capable of making their own decisions.

Although critical thinking development is often declared a priority of educational systems, reliably measuring it is challenging because it is a complex, multidimensional construct. The concept encompasses various cognitive and metacognitive processes, from simple recall of information to evaluation and creative application. A suitable framework for its analysis is offered by Bloom's taxonomy of cognitive objectives, which includes levels such as remembering, understanding, applying, analyzing, evaluating, and creating (Krathwohl, 2002).

To measure students' critical thinking, two main types of tools are used: performance-based tests and self-assessment questionnaires (Ku, 2009; Liu et al., 2014). Performance-based tests, such as the California Critical Thinking Skills Test (CCTST), measure actual cognitive skills like analysis, deduction, interpretation, or evaluation of evidence (Facione, 2011). Self-assessment questionnaires measure students' perception of their abilities – how they perceive and evaluate their skills in areas such as understanding, analysis, or creation (Stupple et al., 2017). Their advantages include easier administration, lower time demands, and the ability to capture attitudes, motivation, and self-confidence related to critical thinking (Vafamehr et al., 2024).

An important aspect of examining critical thinking is not only objective measurement of students' outputs but also the perspective of teachers who lead and guide the learning process. Teachers play a key role in the development of critical thinking, as their expectations, assessments, and teaching methods significantly influence the types of cognitive activities students engage in (Ennis, 2018). If teachers perceive certain areas as strong or weak, it translates into teaching priorities and instructional decisions. Discrepancies may occur between teachers' perceptions of students' abilities and the actual skills students possess (Gentrup et al., 2020). Such a mismatch between teacher evaluations and students' self-assessments can undermine the effectiveness of instruction. When a teacher offers support in areas that students do not consider challenging, the assistance is unlikely to be perceived as relevant or beneficial. Rather than enhancing learning, this may result in reduced engagement and lower intrinsic motivation to learn (Kruger, Dunning, 1999). The aim of this study was to validate the Critical Thinking Questionnaire (CThQ) on a sample of students from vocational secondary schools in Slovakia. After validating the questionnaire, another aim was to identify in which of the assessed areas of critical thinking students from vocational secondary schools feel the least developed based on their self-assessment. The research results may provide important insights for educational practice, particularly in enhancing teaching strategies focused on the development of critical thinking in line with students' individual needs.

2. Literature Review

The concept of critical thinking has undergone significant theoretical development in recent decades, resulting in various definitional approaches. In academic settings, critical thinking is often defined as the ability to objectively analyze information, assess its trustworthiness, form independent judgments, and generate evidence-based solutions (e.g. Scriven, Paul, 1987; Facione, 1990). This foundational framework has been extended to include dimensions of reasoned decision-making. Norris (1985), for instance, defined critical thinking as the reasonable determination of what to do or believe. Another important contribution comes from Elder and Paul (1994), who emphasized personal responsibility for one's own thinking. Their concept moves critical thinking from a purely cognitive level to the level of metacognitive self-reflection, where individuals become responsible for the quality of their thought processes. Scriven and Paul (1987) expanded this understanding by incorporating operational components, defining critical thinking as an intellectual process involving conceptualization, analysis, synthesis, and evaluation of information.

Further development of the concept introduced creativity into the equation. According to Temple et al. (1998), critical thinking is a complex process of creative integration of thoughts and information, a restructuring of concepts. It is an active and interactive cognitive process that occurs simultaneously on multiple levels, typically goal-oriented but also creatively improvised. This definition underscores the active and interactive nature of critical thinking, going beyond passive information processing to include creative reconsideration of existing conceptual frameworks.

Further research (Klooster, 2002) identified five core attributes of critical thinking that form its operational basis. The first is independent thinking, enabling individuals to formulate their own

opinions regardless of external pressure. The second is understanding information as a starting point, not an endpoint, of thinking. The third emphasizes that critical thinking begins with asking questions or posing problems, highlighting an active approach to knowledge, where the thinker is not a passive recipient but an active and creative problem-solver. The fourth is seeking logical arguments that ensure rational decision-making. The fifth sees critical thinking as a social process, recognizing its collaborative dimension. As Facione (2011) states, these attributes are essential not only for civic and societal engagement but also for academic success during students' schooling.

Incorporating critical thinking development into teaching is essential for practical education. Strong critical thinking enhances students' problem-solving, evidence-based decision-making, academic independence, and ability to navigate an information-rich environment (Abrami et al., 2015). As Davies (2015) highlights, classrooms that actively promote critical thinking foster deeper understanding, greater engagement, and better readiness for challenges beyond school.

Klooster's (2002) identified attributes provide a foundational framework for teaching that supports the development of critical thinking. Within this framework, the latest information or problem-solving should be seen as a starting point for new knowledge. The information or problem should spark curiosity, prompting students to ask questions that lead to reflection and discussion. This approach fosters a dynamic learning environment where learning becomes a process of discovery and knowledge construction. Critically thinking students value others' claims and arguments, but they are not afraid to reject them if they deem them incorrect (Dwyer et al., 2014). A major benefit of teaching based on critical thinking attributes is that students learn not only how to process the latest information and methods for solving problems but also how to argue and creatively express and present their own opinions and problem-solving strategies. This aspect of critical thinking development promotes the integration of new knowledge with existing knowledge. Students also become more cautious in forming or changing their judgments (Facione, 1990).

Thus, a key element in developing critical thinking is the ability to seek evidence and make decisions based on it. This approach cultivates students' epistemological responsibility and teaches them to distinguish between credible and non-credible information sources (Holmes et al., 2017). Given the range of critical thinking attributes, its development in the school environment requires systematic use of specific methodological approaches. Classroom activities should include argument analysis, identification of logical fallacies, and evaluation of the quality of evidence (Rossi et al., 2021). These activities help students learn constructive problem-solving, including the ability to reason, discuss, compromise, and accept solutions. A crucial precondition for success is an active student who has mastered basic facts and can assess latest information, engage in discussions, and form independent judgments (Tang et al., 2020).

The extent of student engagement is significantly influenced by the teacher through interactions, teaching strategies, and classroom atmosphere (Shernoff et al., 2017; Hanaysha et al., 2023). However, according to Rahman and Manaf (2017), teachers' efforts to involve students in lessons often result in lowering demands on higher-order cognitive levels when students struggle with lower levels, leading to a preference for memorization over the intentional development of critical thinking.

Another possible cause of the low effectiveness of critical thinking development in the school environment may lie in the complex and multidimensional nature of the concept of "critical thinking" itself. Successful development of critical thinking therefore requires systematic and balanced reinforcement of its multiple dimensions, and any didactic intervention should be based on the real needs of specific students (van Geel et al., 2016). An important element in this process can be the student's own self-reflection. When a student identifies a specific area of critical thinking, such as information analysis or argumentation, in which their skills are weaker than in other areas, it creates an opportunity for intrinsic motivation to improve. In such situations, the student is more likely to view the teacher's support as necessary and helpful, responding to a need they have personally recognized. At this stage, acceptance of guidance is natural, as it is grounded in an internally acknowledged gap (van Uden et al., 2013). On this foundation, the teacher can then, by utilizing the student's increased engagement, purposefully and gradually develop other attributes of critical thinking that they consider important for the student's overall intellectual and academic development. Such an approach connects student autonomy with strategic guidance from the teacher, creating favorable conditions for deeper learning and the development of higher-order cognitive skills (Hadwin et al., 2017). Based on the above, it is clear that effective support for the development of critical thinking must be based not only on the

teacher's professional intentions but also on the students' real needs as perceived by the students themselves. If didactic intervention is to be targeted and accepted, it is essential to identify the areas of critical thinking in which students themselves feel a need for development and what kind of help they would welcome from their teachers. Aligning the perceptions of needs between students and teachers can be the key to more effective and targeted support of higher cognitive processes in the classroom.

3. Methodology

The educational research was carried out in selected vocational secondary schools in Slovakia with the approval of school management, teachers, and participating students. Schools whose management provided preliminary consent were listed alphabetically by city, and four were chosen through simple random sampling using the tool randomnumbergenerator.org. All final-year students at the selected schools were invited to participate via their class teachers. A total of 138 students attended an introductory meeting with the research team, during which they were informed about the study and assured of full anonymity. Researchers addressed all questions, ensuring that responses would not influence students' behavior during the actual study. Ultimately, 104 students aged 18 to 20 participated in the research.

To achieve the research goal of identifying areas where students perceive a need for pedagogical support, it was essential to capture their self-assessment of critical thinking. The Critical Thinking Questionnaire (CThQ) by Kobylarek et al. (2022) was used as the primary data collection instrument. Designed as a practical and pedagogically applicable tool, the CThQ evaluates students' perceived cognitive abilities across six domains – memory, understanding, application, analysis, evaluation, and creation – representing the key dimensions of critical thinking in education. The questionnaire allows an overview of students' perceived strengths and weaknesses in higher-order thinking. Each cognitive domain is represented by a set of statements rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), indicating the extent to which each statement reflects the respondent's own behavior or ability.

For analyzing the results, descriptive statistics and factor analysis were applied as the primary statistical methods.

4. Data Analysis

Prior to the main statistical examination of the data collected using the CThQ instrument, the quality of the dataset was evaluated with respect to its reliability and validity. As these two attributes are inherently linked, with sufficient reliability serving as a fundamental prerequisite for valid measurement, the initial focus was placed on assessing the reliability of the collected responses. For this purpose, reliability coefficients were computed. The internal consistency of the questionnaire was assessed using Cronbach's alpha coefficient, which represents a widely accepted measure of test reliability and is routinely implemented in statistical software environments (Liu, Zumbo, 2007). In the present study, the computation performed in the R statistical software yielded a Cronbach's alpha value of 0.843, reflecting a satisfactory level of internal consistency of the measurement instrument. This result suggests a strong interrelationship among the questionnaire items and indicates that the contribution of random measurement error to the overall test score is minimal. Consequently, the obtained value of $\alpha = 0.843$ can be interpreted as evidence of reliable data (Cronbach, 1951).

In the subsequent stage of statistical processing, the dimensional structure of the dataset was explored through the application of principal component analysis in order to identify underlying latent variables. The eigenvalues of the correlation matrix were calculated using the R statistical software. Following Kaiser's criterion, the number of extracted factors corresponds to the count of eigenvalues exceeding the threshold value of one. Eigenvalues satisfying this condition are reported in Table 1.

Table 1 indicates that six eigenvalues of the correlation matrix exceed Kaiser's threshold and together explain 65.123 % of the total variance. Due to the complexity of the initial factor solution, factor rotation was applied to improve interpretability and obtain a simple structure, in which each factor is strongly associated with a limited set of variables. This simplification was achieved using the VARIMAX rotation method (Osborne, 2015), resulting in the factor loading matrix shown in Table 2.

Table 1. Eigenvalues of the Correlation Matrix

Value number	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	5.110	26.935	5.110	26.935
2	3.040	14.997	8.149	41.932
3	1.919	7.686	10.068	49.618
4	1.576	6.099	11.644	55.717
5	1.334	5.335	12.978	61.052
6	1.218	4.071	14.196	65.123

Table 2. Estimation of Factor Saturation Matrix

Factors and items	Factor loading					
	1	2	3	4	5	6
Factor 1: Analyzing						
4. In-depth analyses of reality are a waste of life	**0,52**	-0,13	0,10	0,09	-0,14	0,13
12. I like finding dependencies between seemingly different phenomena	**0,61**	-0,22	0,16	0,12	0,23	-0,04
17. I can extract the most relevant parts of a text	**0,42**	0,08	0,26	-0,09	0,19	0,25
24. When I read the text, I am researching for a relationship between the information it contains and other texts that I have read	**0,78**	0,23	0,03	0,04	0,20	0,11
Factor 2: Evaluating						
1. After reading it, I check important information, even if it seems to be true	-0,14	**0,50**	-0,05	-0,10	0,05	-0,23
11. In the discussion, I care about justifying my stance on the matter and understanding the other party at the same time	0,03	**0,59**	-0,11	0,13	0,08	0,14
16. When I am interested in some information, I try to check if it is true	0,07	**0,49**	-0,15	0,23	0,22	0,16
18. To evaluate the information, I check many sources	0,22	**0,43**	-0,04	0,04	-0,24	0,05
Factor 3: Creating						
2. I like combining information from different texts	0,03	-0,16	**0,41**	0,15	0,06	0,19
6. The same content can be expressed in many different ways	0,09	0,17	**0,48**	-0,19	0,02	0,05
8. I form my impression on the basis of various information that I combine with each other	0,15	-0,23	**0,67**	-0,28	-0,23	-0,13
9. Everything already exists, so nothing completely new can be created	0,16	0,12	**0,52**	-0,06	-0,25	-0,22
13. I can see the structure of the text, and I could change it	0,14	0,07	**0,73**	0,25	-0,15	0,16
20. I like discussing new meanings in texts that I already know	0,02	0,17	**0,68**	0,07	-0,01	-0,15

Factor 4: Remembering						
5.After reading it, I am able to repeat important threads from the text	0,02	-0,19	0,16	**0,55**	0,06	0,19
15. If necessary, I can recall information about which I once read	0,06	-0,26	0,14	**0,61**	0,29	0,02
19. I do not remember much from what I was learning at school	0,07	-0,06	0,16	**0,80**	0,13	-0,27
Factor 5: Understanding						
7. I can understand texts from various fields	0,11	0,03	0,13	-0,12	**0,55**	-0,27
21. I like to collate different opinions and compare them with each other	-0,23	-0,17	0,30	-0,01	**0,58**	0,27
22. I have difficulties with paraphrasing	0,06	0,05	0,05	0,17	**0,47**	-0,11
25. I pay attention to the contexts, nuances and overtones of the statements	-0,07	0,28	-0,09	-0,20	**0,44**	-0,25
Factor 6: Applying						
3. I am willing to share the newly gained information	0,08	0,29	0,01	-0,04	0,00	**0,49**
10. When I talk, I give many examples	-0,16	0,24	0,16	0,08	0,05	**0,76**
14. When discussing, I try to use practical examples to justify my stance on the matter	0,18	0,09	0,02	0,11	0,13	**0,55**
23. I try to use the information I have learned in everyday life	-0,23	0,25	0,23	0,20	0,26	**0,67**
Eigenvalues	5,11	3,04	1,92	1,58	1,33	1,22
% of variance	26,94	15,00	7,69	6,10	5,33	4,07

The factor analysis indicated that the results presented in Table 2 align with the allocation of variables to the respective factors as originally defined by the questionnaire developers. Based on these findings, it can be concluded that the sample of respondents in this study is sufficiently representative. Moreover, the consistent distribution of questionnaire items across factors allows the retention of the original factor names.

Using the data collected through the CThQ questionnaire, the mean score across all items was calculated. The resulting average of 3.05 (on a 1–5 scale) suggests that participants generally perceive their critical thinking abilities as ranging from average to slightly above average.

Subsequently, mean scores were determined for each individual factor (Figure 1). For clarity, the factors were organized in accordance with the revised Bloom's taxonomy (Krathwohl, 2002).

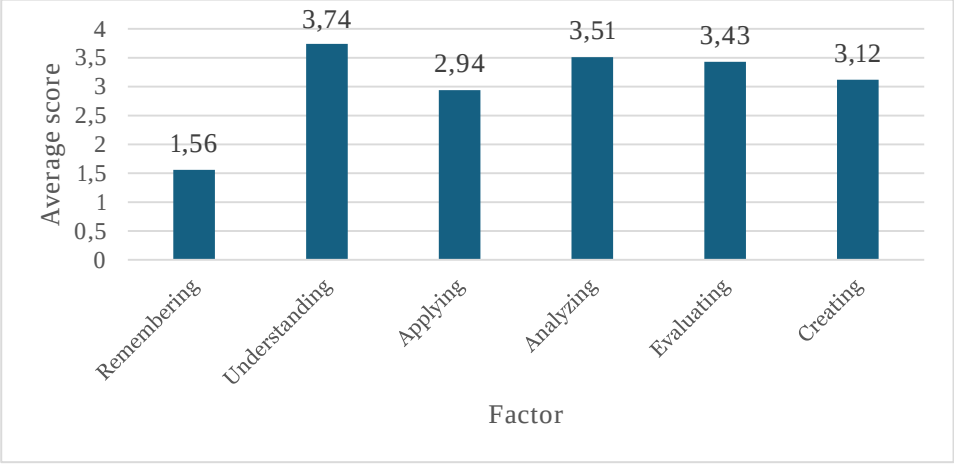

Fig. 1. Average scores in individual dimensions

Figure 1 shows that students achieved the lowest average score in the *Remembering* factor. This very low average score (avg = 1.56) was primarily caused by item 19: *"I do not remember much from what I was learning at school"*, which also had the highest saturation within this factor. The highest average score was achieved in the *Understanding* factor (avg = 3.74), mainly due to item 22: *"I have difficulties with paraphrasing"*, where students scored an average of 4.52.

5. Discussion

In vocational education, the theoretical foundations of critical thinking serve as a driving force for the incorporation of active learning strategies. Effectively fostering critical thinking requires learning activities that actively engage students, enrich their experiences, promote independent knowledge acquisition, develop sound judgment, and encourage responsible behavior. As Kroiče (2015) emphasizes, reflection and self-assessment are central processes that facilitate the development of students' critical thinking skills. These processes allow students not only to evaluate retrospectively their approaches to knowledge and problem-solving but also to recognize their cognitive strengths and weaknesses – an essential prerequisite for metacognitive development and the gradual assumption of responsibility for their own learning.

In the self-assessment questionnaire CThQ, students reached an average score of 3.05. This value lies slightly above the neutral midpoint of the scale, suggesting that students generally perceive their critical thinking skills as average to slightly above average. This means they see themselves as capable of critical thinking, which may positively influence their engagement in education and openness to complex problems.

From a pedagogical perspective, this result should be interpreted with caution. Multiple studies indicate that self-assessments can be biased, particularly among younger or less experienced students who may not have an accurate metacognitive understanding of their abilities. Research by Dunning and Kruger (Kruger, Dunning, 1999) shows that individuals with lower performance often overestimate their skills, resulting in inaccurate self-perceptions. Likewise, Stupple et al. (2017) note that while self-assessment instruments capture important aspects of how thinking is perceived, they may not accurately reflect students' actual performance on tasks that require higher-order cognitive processes.

Considering these findings, it is beneficial to combine subjective self-assessment with deliberate teacher feedback, which can contribute to more accurate student self-knowledge and consequently to more targeted development of specific critical thinking areas. León et al., in their meta-analysis, recommend that teachers explicitly plan and provide external feedback whenever students engage in self-assessment, to correct subconscious biases. Research findings show that teacher support is most effective when provided in areas where the student is aware of their shortcomings (Le Mare, Sohbat, 2002; Jeng, 2024).

The analysis of the collected data, carried out for each dimension of critical thinking according to the revised Bloom's taxonomy, allowed the identification of a specific area of perceived weakness among students. The findings revealed that students considered the Remembering dimension to be their most significant deficiency, with an average score of just 1.56 on a five-point Likert scale. This result clearly reflects a very low level of confidence in this fundamental cognitive domain.

We consider this finding remarkable, as *Remembering* represents the lowest level of cognitive processes within Bloom's taxonomy – it is the ability to recall facts, definitions, procedures, or basic information. The fact that students perceive this particular dimension as problematic is paradoxical, given that this skill is the most strongly emphasized and routinely practiced in traditional school environments (Matsushita, 2017).

This low confidence in the *Remembering* dimension may indicate that students do not sufficiently appreciate the importance of memory for learning. This underestimation may be due to traditional repetitive exercises being perceived as insufficient for deeper understanding and the development of higher-order cognitive abilities (Voogt, Roblin, 2012). Another possible reason for this devaluation may lie in the current educational trend, which increasingly shifts away from so-called "traditional" knowledge reproduction approaches and toward the development of "higher" cognitive skills such as analysis, evaluation, or creativity. In this context, memorization is sometimes seen as less important or even outdated (Maag Merki et al., 2023).

However, the ability to remember facts and information forms a vital foundation for more complex forms of thinking – without an adequate knowledge base, it is impossible to effectively analyze, compare, or generate new connections (Lemov et al., 2016).

Based on our findings, the area of *Remembering* represents a suitable starting point for the systematic support of critical thinking development in students. Since students themselves identified this as their weak spot, targeted teacher support is likely to be seen as relevant and welcomed. The importance of developing this cognitive level is also supported by the fact that low confidence in basic knowledge i.e., the ability to recall and reproduce key facts – can significantly hinder the development of higher cognitive processes such as application, analysis, or evaluation. These higher cognitive processes naturally presuppose certainty in basic knowledge (Acar, van den Ende, 2016).

Therefore, when supporting memorization, teachers should go beyond routine rote learning and aim to integrate memorized information into activities that stimulate higher-order thinking. Effective strategies may include linking facts with conceptual understanding, applying them in problem-solving situations, or using them in constructive discussion. This approach transforms passive knowledge acquisition into active cognitive processing, aligning with the findings of Kane et al. (2004), who emphasize the importance of engaging in higher cognitive skills even when working with factual knowledge.

This suggests that improving memory skills should not be viewed in isolation but rather as part of a broader strategy to develop critical thinking. Exploring effective teaching approaches that enable the transfer from factual knowledge to critical reflection presents a promising direction for future educational research.

6. Conclusion

The results of our research indicate that the development of students' critical thinking should begin with strengthening their confidence in basic cognitive skills, especially in the area of remembering. Students themselves identified this area as their weakness, which highlights the need for targeted teacher support. Effective teaching should not limit work with factual knowledge to rote memorization but should connect it with activities that activate higher-order cognitive processes. Such an approach not only supports students' metacognitive growth but also lays the foundation for deeper understanding and critical thinking. Future research should focus on evaluating specific teaching strategies that enable an effective transition from fact acquisition to the development of critical thinking.

7. Acknowledgments

This work was also supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences under contract No. KEGA 019 ŽU-4/2023.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 76-89
DOI: 10.13187/ejced.2026.1.76
https://ejce.cherkasgu.press

A Comparative Analysis of Interpretation Strategies between Psychology Students and Artificial Intelligence in an Educational Context

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Abstract

The aim of this study is to explore the potential and limitations of artificial intelligence (AI) in psychological counseling. A comparative method was used, based on assessing the differences in interpretation between psychology students and AI systems. Specifically, the phenomenon of overinterpretation, in which conclusions lack sufficient empirical support in the source material, was analyzed.

This article utilized a mixed-methods approach. Specifically, the theoretical part included a literature review on AI counseling across five parameters: methodological commitment, emotional support, therapeutic alliance, ethical considerations, and accessibility. The empirical part involved a pilot pedagogical experiment in which psychology students (N = 44) and the Claude 3.5 Sonnet system independently analyzed identical psychological interviews (N = 22). The resulting analytical texts (N = 66) were subjected to discourse analysis based on the identified markers. For a more in-depth analysis, an independent expert review was used. A theoretical review found that AI is effective within structured protocols (e.g., cognitive behavioral therapy). However, AI has several limitations in establishing a therapeutic alliance and interpreting deep emotional experiences. An empirical study identified stylistic differences between student-produced texts and AI-generated texts. Specifically, student-produced texts were more than three times more likely to contain markers of epistemic caution (3.84 versus 1.20 per 1,000 words). AI-generated texts showed a twofold increase in markers of causality (4.58 versus 1.92) and recommendations (3.61 versus 1.60). Furthermore, AI was more likely to overinterpret type A texts, drawing categorical conclusions based on the absence of information in the original text. Thus, integrating AI into psychology education requires the development of a new professional competency, the essence of which lies in the ability to critically evaluate AI-generated content. Also important is the ability to identify interpretive errors and apply strict evidence boundaries. Artificial intelligence

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can serve as an effective didactic tool for developing critical thinking, provided it is used as a supplementary educational resource. Using artificial intelligence as a standard for professional analysis is not pedagogically incorrect.

Keywords: artificial intelligence, psychological counseling, AI counseling, professional psychology education, overinterpretation, critical thinking, AI literacy.

1. Introduction

The capabilities of artificial intelligence are currently expanding. Artificial intelligence (AI) enables the performance of tasks that have traditionally required human intellectual activity, including learning, decision-making, and natural language processing (Panesar, 2021). In particular, large language models (LLMs) – which can generate coherent texts and sustain dialogue – have been developing rapidly in recent years, leading to their widespread adoption (Ghassemi et al., 2023). This has become one of the reasons why large language models are increasingly being introduced into the humanities and educational sciences.

In psychology, AI is now being used with growing intensity. It should be noted that the orientation toward language models did not emerge suddenly. The precursors of "AI counseling" can be traced back to 1966, when Joseph Weizenbaum created the ELIZA program, which simulated a psychotherapeutic dialogue (Beg et al., 2024). Contemporary AI systems have significantly expanded these capabilities. They function as chatbots, virtual assistants, and specialized digital mental health platforms. Examples include Woebot and Tess, as well as Ukrainian platforms – Druh. Persha dopomoha, AI PSY HELP, and Faino – which are oriented toward psychological support and psychoeducation (Leonova, Leonov, 2025; AI PSY HELP; Faino). In Ukraine, these platforms have acquired particular relevance at the present time. The ongoing war has, first, heightened the population's need for psychological assistance and, second, has altered the familiar model of support. A psychologist is not always accessible (Dotsenko, 2025; Harmash, Pashchenko, 2024). For this reason, chatbots and specialized platforms often become the only channels through which rapid psychological help can be obtained (Leonova, Leonov, 2025).

A paradoxical situation is currently taking shape. On the one hand, we may speak of AI being used as a form of primary psychological assistance – that is, as a counselor. On the other hand, no consensus definition of "AI counseling" exists in the scientific literature. Therefore, in this paper we employ a working definition (which undoubtedly requires further operationalization and elaboration). AI counseling may be defined as a form of psychological assistance provided through AI systems. The substantive components of AI counseling include the analysis of a user's text messages and the provision of support based on the information obtained. Such support may take the form of delivering information the user requires, or of offering emotional support.

In addition, AI counseling may include a prospective component in the form of generating recommendations aimed at improving psychological well-being and self-regulation. It should be emphasized that research in this area confirms AI's capacity to conduct screening psychodiagnostics and, on that basis, to develop individualized psychological intervention plans (Ramirez, 2024). Furthermore, large language models are capable of analyzing the tone of a user's message and adapting their own messages to the user's linguistic behavior patterns (Zhao, 2023). Researchers emphasize that AI has high potential for expanding the accessibility of psychological assistance. This situation affects not only the expansion of opportunities for those seeking psychological help, but may also indirectly alter the employment structure of psychologists themselves. The use of AI counseling by psychologists allows them to focus on providing deeper forms of psychological intervention (Beg et al., 2024; Ramírez, 2024).

While acknowledging the growing significance of AI in psychological counseling, certain problems and challenges must also be noted. In particular, AI is capable of generating structured, stylistically polished texts that create an impression of depth and professionalism. Students may make use of such texts without attempting to engage with their actual context and content. The issue is that behind a seemingly substantive AI-generated text there may lie what could be called "contentless content". Recognizing this phenomenon requires a sufficient level of professional competence – one that students, unfortunately, do not yet possess to an adequate degree. As a result, they frequently perceive AI-generated texts as professional and expert-level, and incorporate them into their academic work. This situation creates yet another difficulty: students begin to uncritically accept AI-generated outputs as authoritative and expert.

Consequently, students may develop erroneous patterns of data interpretation and an excessive dependence on AI (Kim et al., 2025; Shen, Cui, 2024; Xia et al., 2025).

Thus, one of the key competencies in psychological training is the capacity for critical evaluation of AI-generated professional content. This involves several distinct operations: distinguishing description from interpretation, grounding conclusions in empirical data, and avoiding professionally unwarranted inferences. Before such competency can be developed, however, it is necessary to map the differences between students' interpretations of psychological material and those produced by AI.

This article therefore pursues a dual aim. The first is a theoretical analysis of AI's potential and limitations in psychological counseling. The second is an empirical one: we present the results of a pilot pedagogical experiment comparing psychology students' interview interpretations with those of AI, with the broader goal of identifying risks and benefits of integrating AI tools into psychological education.

2. Materials and methods

This study used a mixed-method design, including a theoretical literature review and an empirical pedagogical experiment. The theoretical component included a review of theoretical concepts and empirical research on the use of AI in psychological counseling. Specifically, interaction mechanisms were analyzed, including how AI simulates empathy, the cognitive-behavioral methods it uses, and how it structures dialogue. The limitations of AI were also explored, particularly in interactions with users experiencing complex emotional states or in crisis situations. The theoretical review yielded five key themes concerning the practical implications of AI integration in counseling: (1) adherence to psychotherapeutic methodology and protocols; (2) emotional support and creation of a psychologically safe environment; (3) formation of a therapeutic alliance; (4) ethical considerations and confidentiality; and (5) accessibility of psychological assistance using AI technologies. To empirically assess the differences between student and AI interpretations of interviews, a pilot pedagogical experiment was conducted. This experiment was integrated into the curricula of the courses "Experimental Psychology" (3rd-year, bachelor's degree), "Qualitative Research Methods" (4th-year, bachelor's degree), and "Organization and Methods of Scientific Research in Psychology" (1st-year, master's degree).

2.1. Participants and Procedure

This study employed a mixed-methods approach, combining a theoretical literature review with an empirical pedagogical experiment. The theoretical component involved examining conceptual frameworks and existing research on AI applications in psychological counseling. Specifically, we looked into interaction mechanisms, such as how AI models empathy, its use of cognitive-behavioral techniques, and the way it structures dialogue. Furthermore, the analysis touched upon the inherent limitations of AI, particularly when interacting with users experiencing complex emotional states or crisis situations.

Based on this review, we identified five key areas relevant to the practical implementation of AI in counseling: (1) adherence to psychotherapeutic methodology and protocols; (2) provision of emotional support and a psychologically safe environment; (3) the formation of a therapeutic alliance; (4) ethical considerations and confidentiality; and (5) the accessibility of mental health services through AI technologies.

To empirically evaluate the differences between interview interpretations made by students versus AI, we conducted a pilot pedagogical experiment. This experiment was integrated into the curricula of several courses: "Experimental Psychology" (3rd-year undergraduate), "Qualitative Research Methods" (4th-year undergraduate), and "Organization and Methods of Scientific Research in Psychology" (1st-year graduate).

The study was carried out in three stages, involving psychology students at different levels of their education. The data collection phase was handled by third-year students (N = 22; aged 19–21). For the subsequent analysis phase, we involved fourth-year undergraduate and first-year graduate students (N = 44; aged 21–23). All participants possessed foundational training in psychodiagnostics, qualitative research methods, and counseling principles.

Stage 1. Empirical Data Collection

At this stage, junior undergraduate students (N = 22) participated by developing semi-structured interview guides and interviewing respondents from their immediate social environment. The interview topics were everyday and non-clinical in nature (e.g., "Attitudes

toward pets", "Experience of making important decisions", "The role of friendship"). This focus was determined by the need to avoid ethical risks associated with working with clinical material. The interviews were subsequently transcribed and underwent preliminary technical text review. Each student produced a full verbatim transcript, resulting in a dataset of 22 complete transcripts used for subsequent comparative analysis.

Stage 2. Formulation of Analytical Tasks

Analytical questions requiring deeper interpretive engagement with the material were formulated for each transcript. Examples of such questions include: "What are the main motives underlying this student's academic activity?", "What influenced this respondent's choice of profession?", "What factors are primary in this respondent's decision-making in difficult situations?", and "How does the respondent assess their need for social support?" It should be noted that the questions were formulated on the basis of the specific content of each individual interview.

Stage 3. Parallel Analysis by Students and AI

A total of 22 text packages were prepared, each consisting of an interview transcript and the corresponding analytical questions. Each package was analyzed both by senior students and by an AI system.

(a) Forty-four senior students participated in the analysis of the text packages (4th-year undergraduates and 1st-year master's students). Each text package was independently analyzed by two students, yielding 44 analytical texts.

(b) The same text packages were analyzed by an AI system. Claude 3.5 Sonnet (Anthropic) was used for this purpose.

The resulting dataset comprised 66 interpretations in total (44 student-produced and 22 AI-generated). It should be emphasized that the dataset (44 student and 22 AI interpretations) was derived from the analysis of identical source material – a prerequisite for enabling meaningful comparison of interpretive strategies between humans and AI.

2.2. Text Corpora Characteristics

The student corpus totaled 21,520 words (M = 489.09 words per text), while the AI corpus comprised 15,922 words (M = 723.73 words per text). Lexical density (the ratio of unique words to total text volume) was comparable across both sets: 0.64 for student texts and 0.62 for AI texts. The readability index was 18.28 for the student corpus and 17.7 for the AI corpus. Notably, the average sentence length in the student texts was 16.18 words, whereas AI-generated sentences were substantially longer, averaging 27.98 words.

2.3. Data Analysis Procedures

The texts underwent two modes of analysis.

1. Marker-Based Discourse Analysis

To ensure maximum objectivity, we conducted a semi-automated discourse analysis of marker frequency. Prior to the analysis, the following markers were identified:

(a) Uncertainty markers (e.g., "probably", "one might assume", "it seems");

(b) Causal markers (e.g., "because/since", "therefore", "this indicates," "this suggests");

(c) Certainty markers (e.g., "obviously," "undoubtedly," "a key factor," "certainly," "it is clear that");

(d) Recommendation markers (e.g., "it is worth", "it is advisable", "it is recommended", "it is necessary").

The texts were reviewed manually in MS Word. Each text was searched for marker words and their occurrences were counted. Given that the resulting text corpora varied in length, the frequency of marker words and phrases was normalized per 1,000 words. All identified marker instances were additionally verified in context to exclude false positives (e.g., atypical usage).

We define over-interpretation as an analytical error in which a conclusion lacks sufficient empirical justification within the source material. We have identified three types of over-interpretation:

Type A. Conclusions drawn from an absence of information (e.g., concluding that a respondent prefers to spend time alone simply because the interview did not mention specific hobbies or social activities).

Type B. Quasi-diagnostic interpretations lacking sufficient empirical evidence or formal diagnostic validation (e.g., the use of terms such as "introvert", "high anxiety", or "suicidal ideation").

Type C. Overgeneralizations utilizing absolute terminology (e.g., "always," "never," "everyone", "certainly").

To eliminate the risk of subjectivity, the assessment of over-interpretation was conducted by three independent experts. These experts were psychologists experienced in the qualitative analysis of interviews. Each expert evaluated the presence or absence of over-interpretation within the texts. Identified cases were assessed based on pre-defined criteria and classified as Type A, B, or C.

The experts coded the texts independently. Overall, inter-rater reliability regarding the presence of over-interpretation was high (85–90 %). Discrepancies (10–15 %) most frequently occurred in borderline cases, were subtle, or reflected a combination of multiple types. These discrepancies were resolved through consensus-based discussion.

3. Discussion

A theoretical analysis of the literature on the capabilities and limitations of AI in psychological counselling allows us to draw several important observations. On one hand, AI technologies expand access to basic psychological support. At the same time, they are considerably limited when it comes to deep therapeutic contact or the need for nuanced empathic engagement with a client.

One can fully agree with researchers who emphasise the high effectiveness of AI when using algorithmised structured protocols – in particular within the cognitive-behavioural framework (Husnain et al., 2024; Jiang et al., 2024). Large language models can effectively identify cognitive distortions, are capable of sustaining logical dialogue, and can propose structured interventions. In other words, AI is quite effective when therapeutic influence is grounded in clear algorithms.

Psychology is currently developing a rather high regard for algorithmised intervention, which is viewed as a rapid and effective therapeutic approach. However, one can agree with Podolan and Gelo (2024), who argue that the outcome of psychotherapy depends not only on protocol adherence but, above all, on the competence of the practitioner and the effectiveness and quality of the therapeutic relationship. This view is reinforced by reports of AI's inflexibility.

Regarding emotional support provided by AI, a certain paradox is currently emerging. On one hand, users often perceive interaction with AI as emotionally safe due to its relative predictability and the absence of human evaluative judgements (Yahaya, Rukayya, 2024). On the other hand, AI frequently demonstrates "toxic positivity" and fails to grasp psychological ambivalence, pointing to the superficiality of algorithmised dialogue. At present, AI cannot provide deep empathic acceptance or process complex emotions, which renders interaction with it rather shallow (Peluso, Freund, 2018).

Thus, the formation of a genuine therapeutic alliance with AI currently appears to be fundamentally impossible. Despite the subjective feelings of support reported by some users, empirical data confirm that algorithm-based interaction with AI is qualitatively different from a human therapeutic alliance (Wang et al., 2025). AI does not possess the capacity for genuine mutuality, sincere self-disclosure, or reciprocal influence – the very foundations upon which real therapeutic relationships are built.

AI-assisted counselling also gives rise to ethical dilemmas that cannot currently be resolved within the framework of traditional clinical practice. The widespread adoption of AI technologies raises new questions concerning confidentiality, informed consent, and accountability. In interactions with AI, users may encounter the phenomenon of "diffused responsibility", whereby harm cannot be compensated or further assistance obtained (Jiang et al., 2024; Ramírez, 2024). It should also be noted that behind AI's apparent democratisation lies digital inequality: access to AI systems may be restricted for certain social groups due to a lack of devices, internet connectivity, or electricity.

One argument in favour of AI use may be comprehensive technological support from governmental or non-governmental structures, particularly in force majeure or extreme circumstances. Location-independent support genuinely expands access to basic psychiatric care, especially in crisis situations such as the ongoing war in Ukraine (Leonova, Leonov, 2025).

Within our pilot pedagogical project, we sought to examine how certain characteristics of AI manifest within an educational paradigm. A comparison of interview interpretations produced by students and by artificial intelligence revealed consistent divergences in analytical style and distinct risks of interpretive error. For instance, student texts more frequently contained markers of caution, reflecting a tendency toward careful consideration of assumptions and acknowledgement of the limits of one's own experience. Texts generated by AI more frequently employed markers of causal reasoning and recommendation. This linguistic profile superficially

resembled an authoritative "expert" style, yet was accompanied by over-interpretation, making the AI's conclusions excessively categorical.

Notably, categorical conclusions were systematically drawn on the basis of absent information. For example, AI interpreted the absence of any mention of a particular life domain in an interview as conclusive evidence of its insignificance in the respondent's life. This empirical finding underscores the need to reconceptualise the role of AI in psychological education. AI output should not be treated as a standard of professional psychological interpretation; rather, AI may be used as a supplementary educational tool through which students can learn to recognise hidden analytical errors. This pedagogical strategy should, on one hand, employ AI as an assistive instrument for working with texts, and on the other, train students to critically evaluate both texts and their overall engagement with AI.

4. Results

4.1. Systematic Review Results: Key Dimensions of AI Counseling

A theoretical analysis of the literature on the assessment of AI's capabilities in counselling identified a number of key aspects. AI systems are primarily able to follow protocols and maintain the structure of psychotherapeutic interaction. While this may appear to be a condition for therapeutic effectiveness, strict protocol adherence in psychotherapy does not always guarantee a therapeutic outcome. The study by Podolan and Gelo revealed a weak correlation between protocol adherence and clinical outcomes, leading the authors to conclude that adherence to protocol is an important but not absolute condition for effective therapeutic intervention. In other words, AI counselling algorithms perform well within structured methods but are less predictable in situations of high uncertainty.

Contemporary applications such as Woebot and Tess have well-refined algorithms that enable them to effectively simulate session sequences, sustain engagement, and monitor users' emotional states. The most compelling results in this context are produced by structured approaches – most notably cognitive behavioural therapy (CBT). Jiang et al. demonstrated that modern chatbots employ natural language processing (NLP) and large language models (LLMs) to identify cognitive distortions, reproduce the stages of cognitive restructuring, generate response scenarios, and track respondents' progress. On the other hand, in less formalised therapeutic approaches, AI demonstrates a number of limitations. Wang et al. showed that, despite a natural conversational interface, chatbots lack the flexibility required for interpersonal interaction. Thus, AI may be quite effective in interventions grounded in algorithms, but has limited effectiveness in non-formalised interaction.

4.1.2. Emotional Support and the Creation of a Safe Environment

The primary indicators of effective AI-assisted counseling, according to users, are emotional support and the subjective perception of psychological safety. At the same time, the concept of safety is understood differently in the context of interaction with a human counselor versus an AI counselor.

Safety within traditional psychotherapy relies on a secure environment for self-exploration and processing of complex emotions (Podolan, Gelo, 2024), whereas AI counseling reconceptualizes this dynamic. Safety in the context of AI interaction is grounded in predictability, the absence of human evaluative judgments, and a degree of anonymity. The study by Yahaya and Ruqayyah confirmed that users frequently perceive AI counselors as safe, given that interactions with them involve no negative assessments and, as a result, users do not experience stigmatization. An additional safety-related factor is the stability of algorithmic responses. Wang et al. (2025) emphasized that LLM-based chatbots demonstrate response consistency that is free from human emotional fluctuations, thereby enhancing the user's sense of control and predictability.

A limitation of AI algorithms is "toxic positivity," whereby the algorithm produces optimistic responses and comments regardless of context, which may invalidate the user's experience. Furthermore, the inability of AI to process nonverbal cues results in a simplified and superficial interpretation of the client's emotional state (Wang et al., 2025).

4.1.3. Formation of the Therapeutic Alliance

The criteria for a therapeutic alliance include emotional connection, goal alignment, and shared task performance (Podolan, Gelo, 2024; Prusiński, 2022; Tschuschke et al., 2020). While these predictors are reliable indicators of effectiveness in human-human interactions, many questions remain in human-AI interactions. A fundamental question is whether AI can form a

high-quality therapeutic alliance that goes beyond simply providing structured support. A review of the literature revealed two main trends.

On the one hand, users often perceive chatbots as supportive partners due to their constant availability, non-judgmental stance, and emotional predictability. This communication style reduces user anxiety and may facilitate self-disclosure. Such AI-based tools are particularly valuable for individuals who avoid interacting with human professionals due to shame or fear of stigma (Beg et al., 2024; Seow et al., 2021; Yahaya, Rukayya, 2024). On the other hand, despite using empathically coded language, AI cannot create the depth of relationship characteristic of human therapeutic contact; that is, interactions with AI are more functional than a mutually evolving alliance (Wang et al., 2025).

The inability to achieve genuine empathic reciprocity is a critical limitation of AI. Algorithms can mimic the linguistic markers of empathy, although they actually lack lived experience. The lack of real human experience and emotional depth limits interactions with users and undermines the mechanisms associated with authenticity, rupture-repair cycles, and relationship deepening (Wang et al., 2025). Although AI can create the illusion of support, which is necessary for both initial contact and consolidating gains between sessions (Beg et al., 2024; Yahaya, Rukayya, 2024), its ability to build a comprehensive therapeutic alliance remains limited (Podolan, Gelo, 2024; Wang et al., 2025). It is therefore crucial that students understand these features of AI algorithms. Psychological education should clearly define this boundary: AI functions as a tool, but cannot replace human interaction as the foundation of the therapeutic alliance.

4.1.4. Ethical Risks and Confidentiality

The integration of AI-assisted counseling into practice gives rise to a number of ethical dilemmas that extend beyond traditional therapeutic boundaries. While practicing professionals operate within strict professional guidelines and codes of ethics, AI systems currently function within ambiguous regulatory frameworks. This creates risks related to confidentiality, algorithmic transparency, accountability, and the scalability of potential harm (Beg et al., 2024). Privacy concerns are of particular importance, especially with regard to minors, who frequently turn to AI counselors with their questions – a context in which there is no means of monitoring the level of privacy protection or ensuring informed consent (Ardity, Thompson, 2023; Kafka et al., 2024).

Data security is of critical importance. AI platforms collect vast amounts of sensitive information, including dialogue content and metadata – such as frequency of use and emotional trajectories – stored within digital ecosystems (Ramírez, 2024). This situation is considerably vulnerable, further compounded by opaque privacy policies that remain largely incomprehensible to users (Alfano et al., 2023; Beg et al., 2024; Fiske et al., 2019). Informed consent may be further complicated by the anthropomorphization of AI. Users frequently overestimate the capabilities of chatbots, projecting human-like understanding onto algorithmic responses (Eberle et al., 2021; Wang et al., 2025). This leads to excessive trust in AI-generated information, potentially guiding users toward erroneous decisions (Gipps, 2023; Wang et al., 2025).

The distribution of responsibility also presents a serious challenge. In AI-assisted counseling, accountability is dispersed among developers, platform providers, and implementing organizations. This creates a regulatory vacuum regarding liability for algorithm-induced harm – a risk that is further amplified by the scalability of the technology (Jiang et al., 2024). Additionally, algorithmic bias and cultural adequacy require careful scrutiny. Models trained predominantly on WEIRD datasets (Western, Educated, Industrialized, Rich, and Democratic) may generate recommendations that are ill-suited to the cultural contexts of other social groups (Ramírez, 2024). Furthermore, the digital divide limits genuine accessibility for vulnerable populations, contradicting the technology's claims of democratization. Consequently, AI-related ethical competence – encompassing critical evaluation of risks concerning privacy, bias, and accountability – must become a mandatory component of professional training for psychologists (Beg et al., 2024; Hunt, Blease, 2024; Jiang et al., 2024; Ramírez, 2024; Wang et al., 2025).

4.1.5. Accessibility of Psychological Assistance

One of the key advantages of AI counseling is the expansion of accessibility to psychological support. Artificial intelligence technologies are capable of partially removing the geographical, temporal, economic, and social barriers inherent in traditional therapy (Aljunaidel et al., 2024). However, this expansion of accessibility is uneven and is accompanied by the emergence of new risks.

AI is able to overcome geographical barriers, which is particularly significant in crisis contexts. Leonova and Leonov highlighted the importance of AI-based mental health tools in the

context of the war in Ukraine, where traditional infrastructure has been disrupted and populations in conflict zones lack access to in-person assistance. Local digital initiatives – such as Druh. Persha dopomoha, AI PSY HELP, and Faino – have already demonstrated the applied potential of such solutions in situations where conventional psychological support is unavailable. Temporal accessibility is also substantially enhanced: AI-based services provide round-the-clock support (24/7) and enable immediate intervention during acute distress (Husnain et al., 2024). These features reduce clients' dependence on specialists' schedules and make interaction with an AI counselor more flexible. In addition, AI improves the economic accessibility of psychological support through free or subscription-based models (Ramírez, 2024). However, the monetization of accessibility is frequently accompanied by the collection of user data, resulting in a violation of the confidentiality principle. In effect, users pay for platform access at the cost of their own anonymity (Olawade et al., 2024; Ramírez, 2024).

Importantly, AI also lowers the psychological barriers to help-seeking. Perceived anonymity and the absence of judgment make AI an attractive point of first contact for users who avoid traditional therapy due to stigma (Yahaya, Rukayya, 2024). Nevertheless, technological anonymity does not guarantee genuine confidentiality, and using AI to circumvent stigma does not address the social roots of its existence (Beg et al., 2024; Yahaya, Rukayya, 2024).

While multilingual AI models broaden access for linguistic minorities, Jiang et al. note that linguistic accessibility is not equivalent to cultural appropriateness. AI counseling models require adaptation to the cultural characteristics of their users – in particular, to their perceptions of mental health and their ways of expressing distress. On one hand, AI may be especially valuable for certain social groups, such as individuals with social anxiety or limited mobility; on the other hand, it may be inaccessible or potentially unsafe for groups with different characteristics – for example, older adults or individuals with cognitive impairments, who may be classified as having a high degree of digital vulnerability.

Based on the foregoing, a hybrid interaction model can be proposed that combines elements of AI counseling with traditional psychological support. In such models, AI provides initial support, psychoeducation, and symptom monitoring, while human professionals assume responsibility for crisis intervention, complex casework, and the development of therapeutic relationships (Beg et al., 2024). Implementing this approach requires the development of clear protocols to delineate the respective responsibilities of humans and AI, as well as to identify situations in which human intervention is necessary (Beg et al., 2024; Jiang et al., 2024).

Despite the genuine expansion of accessibility that AI offers, there is a risk of fostering a two-tier system in which AI replaces human therapy for socially vulnerable populations (Beg et al., 2024; Ramírez, 2024). Professional training should therefore emphasize that technological accessibility is not equivalent to therapeutic effectiveness. Future psychologists must be prepared for AI to serve as the first point of contact in the help-seeking process – particularly in crisis or resource-limited situations. This calls for the development of competencies in evaluating AI-generated content, managing processes that involve AI, and effectively routing clients between algorithmic and human resources.

4.2. Empirical Results: Pilot Pedagogical Experiment

4.2.1. Marker Analysis and Overinterpretation Indicators

An analysis of markers and independent assessments of overinterpretation revealed systematic stylistic discrepancies between the student and AI interpretations. Student responses and AI texts represented two qualitatively different analytical profiles. Student texts contained significantly higher frequencies of markers of reflexivity and epistemic caution (e.g., "in my opinion," "one can assume," "probably"). This reflected a tendency to carefully formulate assumptions about the causes of respondents' behavior and avoid premature generalizations. From a pedagogical perspective, such an analysis indicates professional rigor and well-developed critical thinking, as evidenced by students' ability to distinguish facts from interpretations and recognize the limitations of the data.

On the other hand, AI responses more frequently contained markers of causality and structural argumentation (e.g., "since," "therefore," "this indicates," "leads to"). Such constructions created the impression of a logically coherent and systematic analysis. Furthermore, AI-generated texts contained significantly more frequent markers of recommendations and interventions (e.g., "worth," "recommended"), along with lexemes related to "strategies" and "methods," emphasizing a pronounced

focus on practical and actionable results. The AI-generated corpus also more frequently contained markers of confidence (e.g., "obviously," "undoubtedly," "clearly indicates").

Overall, the AI style conveyed an impression of expertise and competence. However, upon closer analysis, AI texts appeared superficial, inattentive to contextual nuances and factual detail, and reflected an inability to work with incomplete data. Quantitative analysis revealed that student texts contained more than three times as many epistemic caution markers as AI texts (3.84 vs. 1.20 per 1,000 words), while AI-generated texts contained more than twice as many causal inference markers (4.58 vs. 1.92) and recommendation markers (3.61 vs. 1.60). Table 1 presents summary marker frequencies. This linguistic methodology is consistent with research demonstrating that AI-generated texts differ from human writing in their marker use and syntactic patterns (Botes et al., 2025). This study adapted this approach to evaluate interpretive strategies in psychology education.

Table 1. Frequency of Discourse Markers in Student and AI Texts (per 1,000 words)

Category	Students (Count)	Students (per 1,000 words)	AI (Count)	AI (per 1,000 words)
Hedging markers (epistemic uncertainty)	83	3.86	19	1.19
Evidentiary markers (data grounding)	58	2.70	38	2.39
Assertiveness markers	10	0.46	11	0.69
Causality/reasoning markers	41	1.90	73	4.59
Ambivalence/contrast markers	107	4.97	77	4.84
Recommendation/intervention markers	34	1.58	57	3.58

Notes: Frequencies are normalized per 1,000 words to account for corpus volume disparities (Student corpus = 21,520 words; AI corpus = 15,922 words).

4.2.2. Overinterpretation as a Key Didactic Risk

Identifying overinterpretation – conclusions lacking sufficient empirical grounding – constituted a critical analytical vector. This error type poses a severe pedagogical risk because it is frequently masked by academic formatting, logical structure, and authoritative phrasing, generating an illusion of evidence-based professionalism. The analysis indicated that AI texts most frequently manifested Type A overinterpretation (conclusions derived from information absence). The AI systematically interpreted the absence of a direct mention in the interview as sufficient grounds for categorical conclusions regarding a trait's presence or absence. For instance, if family support was unmentioned, the AI concluded the respondent was socially isolated.

This interpretational logic is methodologically invalid: an omission may reflect the conversation's specific focus, protocol limitations, or respondent reticence, and cannot automatically denote the phenomenon's absence. This is pedagogically hazardous as it establishes an erroneous standard for data interpretation. Observing AI routinely draw confident conclusions from absent data risks students internalizing this flawed logic as normative. Professional psychological analysis requires strictly differentiating established facts, justified interpretations, and speculative assumptions requiring further data.

Overinterpretation occurred less frequently in student texts and was generally mitigated by modal markers of supposition (e.g., "probably," "one might assume"). However, students also exhibited instances of unjustified categorization (using "obviously") and deployed diagnostic constructs requiring specialized assessment. Overall, AI texts demonstrated a stronger propensity for categorical generalizations based on limited or ambiguous data. Specifically, the AI routinely interpreted omissions as indicators of insignificance – a profound methodological error. Conversely, students navigating incomplete information maintained a more rigorous professional stance by deploying supposition markers.

Consequently, AI should not serve as a standard for correct interpretation. Instead, it operates as educational material enabling students to develop critical analysis skills: identifying hidden interpretational errors, deconstructing rhetorical strategies that manufacture artificial

evidence, and delineating the boundaries of permissible clinical conclusions. Tables 2 and 3 present the quantitative frequencies and illustrative examples of overinterpretation types.

Table 2. Frequency of Overinterpretation Types in Student and AI Texts (per 1,000 words)

Type of Overinterpretation	Students (Count)	Students (per 1,000 words)	AI (Count)	AI (per 1,000 words)
A: Conclusions from absence of information	3	0.14	4	0.25
B: Diagnostic/pathologizing language	21	0.98	23	1.44
C: Excessive generalizations	14	0.65	27	1.70

Table 3. Illustrative Examples of Overinterpretation in Student and AI Texts

Type of Overinterpretation	Student Example	AI Example
A: Conclusions from absence of information	"Close ones and the social environment played an important role, but in the respondent's answers... friends and support are not mentioned, which may indicate her less active participation."	"Family is not directly mentioned – probably, it is secondary in this situation."
B: Diagnostic/pathologizing language	"The respondent is exhausted: experienced stress [related to fatigue?], and this led to procrastination."	"During the most difficult period (second session in 1st year) she experienced apathy and devastation."
C: Excessive generalizations	"After encountering difficulties during university studies, the girl finds support in her own experience... sometimes late procrastination can be a way for her to confirm her capability."	"Communication with classmates almost does not occur; as a result, some of them stopped studying or were mobilized."

4.2.3. Summary of Results and Pedagogical Conclusions

Overall, AI demonstrates strong performance in analyzing text structure and drawing logically grounded conclusions. AI algorithms effectively systematize material, identify thematic blocks, and construct cause-and-effect relationships. Student texts, by contrast, are more reflexive, epistemically cautious, and reflect an awareness of data limitations. However, student texts frequently lack the compositional coherence characteristic of AI-generated output – a situation that most likely reflects the process of developing professional identity, as students learn to balance interpretive caution with analytical confidence.

The "incompleteness" of student analyses creates a pedagogical vulnerability: struggling to produce compositionally coherent texts, students may come to regard AI-generated texts as a professional standard. The idealization of AI output and its uncritical adoption exacerbates categorical and overreaching interpretation among students. AI systems effectively create an illusion of analytical completeness by generating pseudo-scientific terminology, while in reality their texts are often fragmentary or ambiguous. This apparent "pseudo-expertise" of AI promotes uncritical acceptance of generated content and may instill flawed interpretive paradigms in students.

The experimental findings support several practical principles for integrating AI tools into psychology education. Central to this integration is a reconceptualization of AI's role within the curriculum. One of the key professional competencies of a psychologist is the ability to distinguish

between levels of evidential support for clinical claims. This means that students must learn to rigorously differentiate between established facts ("the respondent reported..."), justified interpretations ("this may indicate..."), and hypothetical assumptions ("probably," "one might suggest"). Instructors should emphasize that the use of epistemic caution markers reflects professional maturity and epistemological rigor – not analytical weakness.

This reflects the principle of interpretive evidence: every substantive claim must be grounded in specific empirical data, such as direct quotations, observable behavior, or psychodiagnostic findings. Accordingly, learning assignments should be designed to develop students' ability to justify their key professional conclusions, as this constitutes an essential condition for the development of psychological thinking.

An important task for instructors is the systematic identification and critical analysis of overgeneralizations, inferences drawn from absent information, and unsubstantiated quasi-diagnostic formulations in student texts. Concrete examples of interpretations can also be used as didactic material in group discussions. Comparative analysis of student texts and AI-generated texts may serve as an effective mechanism for developing professional reflection. Assignments requiring students to compare their own texts with AI output, identify typical algorithmic errors, and deconstruct concealed rhetorical strategies will effectively foster critical evaluation skills, preparing future psychologists for the responsible clinical use of AI. The integration of AI into psychology education thus implies the formation of a professional stance that consciously defines both the capabilities and the limitations of AI algorithms. It is therefore essential that, in the course of their training, students learn to critically evaluate AI-generated content and understand which clinical tasks can be safely delegated to an algorithm.

Limitations

This pilot study acknowledges several limitations. First, the restricted sample size (N = 22 interviews; 44 students and 22 AI interpretations) constrains statistical power and the generalizability of the findings. Second, the interviews focused on everyday, non-clinical topics; analyzing clinical material may yield different interpretational dynamics. Third, the students were aware of their participation in the study, potentially inducing a Hawthorne effect that increased their linguistic caution. However, the identified discrepancies remain systematic and quantitatively robust, exhibiting two- and threefold differences in key discourse markers. The students' threefold predominance in epistemic caution (3.84 vs. 1.20 per 1,000 words) and the AI's twofold predominance in causality markers (4.58 vs. 1.92) transcend random variance, reflecting fundamentally divergent analytical strategies.

Prospects for Further Research

These preliminary findings establish several trajectories for future research. First, longitudinal studies are necessary to determine if systematic exercises in critically analyzing AI content cultivate enduring skills in recognizing overinterpretation and ultimately enhance graduates' clinical proficiency. Second, future research should incorporate clinical datasets to evaluate whether the observed human-AI discrepancies persist in complex diagnostic scenarios requiring differential diagnosis and multilevel interpretation. Third, dedicated empirical evaluation of Ukrainian AI psychological support platforms (e.g., AI PSY HELP, Faino, Druh) is critical. Assessing their clinical efficacy, cultural adequacy, and impact on help-seeking behaviors is essential for establishing an evidence base for their integration into national mental health infrastructure. Finally, a comparative analysis of various AI models (e.g., Claude, ChatGPT, specialized clinical chatbots) regarding the frequency and typology of interpretational errors is required to identify the safest systems for educational deployment.

5. Conclusion

This study demonstrates qualitative discrepancies in the interpretive strategies employed by psychology students and AI systems when analyzing qualitative interviews. Student texts are characterized by pronounced epistemological caution and reflexivity. AI-generated texts, by contrast, exhibit formal structural coherence and linguistic markers of confidence. At the same time, AI texts are oriented toward overinterpretation, drawing categorical conclusions without sufficient empirical grounding in the source material.

The literature review confirms the considerable potential of AI-assisted counseling – particularly in democratizing access to basic psychological support, especially in crisis situations. However, the clinical effectiveness of AI remains structurally limited, given its weak capacity for

processing deep emotional experiences, forming a therapeutic alliance, and managing the nuanced interpersonal dimensions of clinical contact. The most viable operational model may be the integration of AI as a supplement to traditional psychological support, rather than its deployment as an autonomous clinical unit.

In professional psychological education, the primary goal should shift from simply training students to use AI tools toward developing the ability to critically evaluate AI-generated content. The constituent elements of such training may include learning to identify concealed interpretive errors, rigorously upholding evidential standards in the formation of clinical conclusions, and maintaining the epistemological boundaries of psychological interpretation. With targeted pedagogical support, AI can serve as a highly effective didactic resource for developing students' critical thinking – provided it is not treated as a standard of analytical interpretation, but rather as a dynamic resource for identifying and mitigating typical diagnostic risks. Ultimately, the integration of AI into clinical training requires the formation of a new professional competency: the capacity to accurately assess the limitations of algorithms, establish parameters for their clinical application, and actively preserve the therapeutic presence of the human practitioner as the irreplaceable foundation of psychological support.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 90-104
DOI: 10.13187/ejced.2026.1.90
https://ejce.cherkasgu.press

Contemporary Chinese Commercial Literature in Higher Education: Empirical Evidence for Critical Thinking Development Through Structured Textual Analysis

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Abstract

We examined whether analyzing controversial contemporary Chinese commercial literature develops critical thinking and intercultural competence more effectively than traditional approaches using canonical texts. During the 2023–2024 academic year, 156 undergraduate students across three Russian universities participated in a quasi-experimental study comparing structured three-phase analytical framework with conventional lecture-based instruction. Pre-post testing using Watson-Glaser Critical Thinking Appraisal showed experimental group gains of 8.3 points (Cohen's d = 0.73) versus control group gains of 2.1 points (d = 0.31), with interaction effects revealing differentiated impact based on students' initial analytical competencies. Qualitative analysis of 81 reflective essays totaling 128,778 words identified three cognitive shifts: recognition of implicit ideological positioning through close textual examination (66 of 81 essays), development of analytical distance enabling evaluation beyond personal reaction (56 essays), and enhanced capacity for identifying narrative manipulation strategies (62 essays). Focus groups with 36 participants revealed that materialistic content in Guo Jingming's "Tiny Times" trilogy generated productive cognitive dissonance, forcing explicit consideration of value systems typically taken for granted in canonical literature study. Mixed-effects modeling controlling for university site and prior coursework demonstrated significant main effect of instructional approach ($F(1,152) = 18.94$, $p < 0.001$) alongside interaction between approach and initial critical thinking quartile ($F(3,152) = 6.27$, $p < 0.001$), suggesting structured engagement with ideologically provocative texts benefits students across competency levels while producing particularly strong effects for mid-range students. Findings challenge assumptions about pedagogically appropriate texts and demonstrate that commercial popular literature, when paired with explicit analytical scaffolding, serves as powerful resource for developing evaluative thinking capacities central to 21st-century literacy.

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Keywords: critical thinking pedagogy, textual analysis instruction, contemporary Chinese literature, intercultural competence development, quasi-experimental educational research, commercial literature in academia

1. Introduction

Recent meta-analysis of critical thinking training effectiveness across 47 studies revealed large positive effects (Hedges' g = 0.84) on both critical thinking skills and academic achievement, yet substantial variation in effect sizes (ranging from g = 0.21 to g = 1.47) suggests that instructional approaches matter tremendously. Most studies analyzed in that review employed traditional academic materials – philosophical texts, scientific articles, historical documents – leaving unexplored whether commercially successful popular literature might serve equally well or better for developing critical literacy competencies. This gap proves particularly significant given that young adults globally consume vast quantities of commercial fiction while academic curricula continue privileging texts validated by literary establishments, creating disconnect between students' actual reading practices and materials deemed pedagogically appropriate. The question becomes not whether students should read commercial literature (they already do), but whether structured academic engagement with such texts might develop analytical capacities transferable to other contexts.

Text selection constitutes critical pedagogical variable distinct from instructional method. Meta-analytic evidence demonstrates that content domain significantly moderates critical thinking instruction effectiveness (Abrami et al., 2015), with domain-specific approaches outperforming generic training (d = 0.30 difference). Yet systematic reviews reveal overwhelming focus on canonical academic materials – philosophical dialogues, scientific reports, historical documents – presumed inherently valuable for developing analytical competencies. This presumption conflates cultural capital with cognitive affordances: canonical texts derive status from institutional validation rather than demonstrated superiority for developing transferable thinking skills. Crucially, texts generating affective tension and ideological dissonance may offer distinct pedagogical advantages by forcing explicit examination of evaluative frameworks that canonical materials leave implicit. When students encounter texts pre-certified as "literature worthy of study," they inherit rather than construct critical frameworks; when engaging commercially successful but aesthetically controversial materials, they must articulate principled positions from evidence – precisely the cognitive work developing critical thinking.

Contemporary Chinese youth literature presents compelling case for investigating this pedagogical potential. Guo Jingming's "Tiny Times" trilogy sold over 9 million copies between 2008–2012, adapted into film series grossing 1.67 billion RMB, and influenced entire generation of young Chinese readers despite or perhaps because of virulent criticism from literary establishment condemning its materialism and perceived corruption of youth values. Commercial success itself offers no pedagogical justification – popularity indicates cultural resonance, not instructional value. However, the polarized reception creates distinct pedagogical opportunity: texts generating simultaneous mass appeal and elite condemnation require readers to navigate competing evaluative frameworks rather than accepting singular authoritative interpretation. The pedagogical value lies not in commercial metrics but in cognitive demands imposed by ideological controversy. This polarized reception creates pedagogical opportunity precisely because texts generating strong affective responses and ideological tensions require readers to examine their own evaluative frameworks rather than simply absorbing instructor-provided interpretations. When Liu Qiang, prominent critic writing in People's Daily (2013), declared "we cannot unconditionally permit Tiny Times", he articulated precisely the kind of censorious judgment that demands critical examination: who constitutes "we", what makes permission conditional, and what assumptions underlie rejection of commercially successful literature as threat requiring restriction?

Existing research on using literary texts in foreign language education demonstrates benefits for vocabulary acquisition, grammatical competence, and cultural knowledge, but stops short of examining whether controversial commercial texts might uniquely facilitate critical thinking development through the cognitive dissonance they generate. Studies of intercultural competence in language education, synthesized in recent bibliometric review of 2,429 publications spanning 67 years, highlight growing integration of intercultural competence into curricula but reveal limited attention to how literary texts – particularly controversial contemporary materials – might develop critical cultural awareness beyond surface-level knowledge. Similarly, research on critical literature

pedagogy demonstrates that Dutch teachers pay little attention to representational issues in texts, potentially reinforcing hegemonic worldviews, yet lacks empirical evidence regarding pedagogical approaches that successfully develop students' capacity to analyze how texts encode ideological positions. These gaps motivated our investigation of whether structured analytical framework could transform commercially successful but critically dismissed literature into powerful pedagogical resource.

We designed quasi-experimental study comparing two instructional approaches: experimental groups analyzed Guo Jingming's "Tiny Times" through three-phase framework emphasizing close textual examination, theoretical contextualization, and independent evaluative synthesis, while control groups studied canonical Chinese literature (Lu Xun, Yu Hua, Mo Yan) through traditional lecture-based approach. Our central hypothesis held that controversial commercial texts, when paired with explicit analytical scaffolding, would produce stronger critical thinking gains than canonical texts taught conventionally because students must actively construct evaluative frameworks rather than passively receiving established interpretations. We predicted interaction effects between instructional approach and students' initial competency levels, expecting mid-range students to benefit most from structured engagement with challenging materials. Qualitative investigation examined what cognitive processes emerged during analytical engagement, how students negotiated tensions between personal responses and critical distance, and what aspects of instructional design proved most valuable for developing transferable analytical capacities.

2. Methods

We conducted quasi-experimental study during 2023–2024 academic year across three Russian universities offering comparative literature and cultural studies programs. Total enrollment of 203 students in designated courses provided sampling frame; final analysis included 156 participants (76.8 % retention) who completed both pre- and post-testing plus substantial coursework requirements. Attrition occurred primarily due to course withdrawal (n = 31) or failure to complete post-testing (n=16), with no significant differences in attrition rates between experimental and control conditions ($\chi^2(1) = 1.84$, $p = 0.175$). Sample comprised 114 female and 42 male students (ages 19-23, M = 20.7, SD = 1.2), reflecting typical gender distribution in humanities programs at participating institutions. Students demonstrated intermediate or advanced proficiency in either English (CEFR B2+ assessed through institutional placement testing) or Chinese (HSK Level 4+ documented through official test scores), with 89 students meeting English criterion, 47 meeting Chinese criterion, and 20 meeting both. Prior literature coursework ranged from two to eight semester-long courses (M = 4.3, SD = 1.8); 34 students had taken no courses specifically addressing contemporary literature from any national tradition.

Assignment to experimental (n = 81) versus control (n = 75) conditions occurred through course section enrollment at each university site, with instructors randomly assigned to teach experimental or control sections. University A contributed 56 students (29 experimental, 27 control); University B contributed 52 students (28 experimental, 24 control); University C contributed 48 students (24 experimental, 24 control). Groups demonstrated equivalence on pre-test measures including Watson-Glaser Critical Thinking Appraisal total scores (experimental M = 24.6, SD = 6.2; control M = 23.9, SD = 6.4; $t(154) = 0.69$, $p = 0.491$), Intercultural Development Inventory developmental orientation scores (experimental M = 97.3, SD = 18.4; control M = 95.1, SD = 19.7; $t(154) = 0.73$, $p = 0.468$), and self-reported prior literature coursework ($\chi^2(6) = 4.12$, $p = 0.661$). Table 1 presents detailed demographic and baseline characteristics demonstrating group comparability.

Experimental intervention consisted of 12-week structured engagement with Guo Jingming's "Tiny Times" trilogy delivered through three distinct four-week phases, each targeting specific cognitive competencies through carefully sequenced activities. Phase 1 focused exclusively on descriptive close reading without interpretive judgment: students created detailed textual inventories documenting narrative structure (chapter organization, temporal sequence, focalization patterns), character relationships (social hierarchies, friendship dynamics, romantic entanglements), spatial representations (geographic locations, architectural descriptions, brand-name references), and linguistic patterns (metaphoric systems, sentence structures, dialogue characteristics). Activities included collaborative annotation using Hypothesis digital platform where students marked specific textual passages and tagged them by type (spatial reference, brand

mention, character interaction, metaphor usage), resulting in comprehensive database of textual features accessible to entire class. Students also created visual maps representing spatial relationships among key locations mentioned in texts, compiled evidence-based character profiles documenting each protagonist's development across trilogy, and participated in "evidence scavenger hunts" where instructor posed factual questions requiring precise textual support. This phase deliberately postponed interpretation to establish shared empirical foundation – collective understanding of what texts actually contain – before moving toward evaluative analysis.

Phase 2 introduced theoretical frameworks for contextualizing observations from Phase 1, explicitly connecting textual patterns to broader cultural and literary phenomena. Students read and applied excerpts from spatial theory (Lefebvre's "Production of Space," Soja's "Thirdspace"), feminist literary criticism (Bourdieu's "Distinction," Rofel's "Desiring China"), postcolonial theory (Said's "Orientalism," Shih's "Lure of the Modern"), and consumer culture studies (Harvey's "Brief History of Neoliberalism," Ritzer's "Enchanting a Disenchanted World"). Rather than comprehensive theoretical training, exposure aimed at providing conceptual vocabulary for articulating relationships between textual features and cultural contexts. Students completed comparative analysis examining how Guo's Shanghai representation relates to 1930s New Sensationist literature (Mu Shiying's "Shanghai Fox-trot"), contemporary Western young adult literature (Gossip Girl series), and canonical modern Chinese fiction (Zhang Ailing's Shanghai stories). These comparisons required identifying parallels and departures across spatial poetics, gender representation, consumer culture depiction, and narrative technique. Collaborative presentations situated "Tiny Times" within Chinese literary history and global consumer culture, with each student group responsible for researching specific contextual dimension (Republican-era Shanghai literature, post-Mao economic reforms, luxury brand marketing in China, film adaptation strategies) and teaching material to peers through 20-minute presentations followed by discussion.

Phase 3 required students to construct independent critical evaluations defended through textual evidence and theoretical frameworks developed in previous phases. Major assignment asked students to write 2,500-word argumentative essay addressing question: "Does 'Tiny Times' merit serious critical attention, and what criteria should guide evaluation of commercially successful popular literature?" Essays required: (1) explicit statement of evaluative position with clear criteria, (2) minimum eight specific textual examples illustrating patterns supporting evaluation, (3) engagement with at least three theoretical frameworks applied in Phase 2, (4) acknowledgment and response to opposing viewpoints, (5) reflection on how analysis process affected initial reactions to texts. Structured debates allocated students to defend positions (some arguing for literary merit, others against) regardless of personal views, forcing articulation of strongest possible arguments on both sides. Debate preparation required compiling evidence portfolios supporting assigned position, anticipating counterarguments, and developing responses. Final reflective essays (750 words) examined students' analytical development across semester, describing how close reading, theoretical application, and argumentative writing transformed understanding of texts and critical thinking more generally.

Control condition studied established canonical works including Lu Xun's "Medicine" and "A Madman's Diary," Yu Hua's "To Live," and Mo Yan's "Red Sorghum Family" through conventional instructor-centered approach. Each class session followed consistent pattern: instructor lecture (35–40 minutes) introducing author biography, historical context, and major interpretive themes; guided whole-class discussion (25–30 minutes) addressing pre-determined questions about symbolism, character motivation, and cultural significance; student presentations (15–20 minutes) on assigned topics such as narrative perspective, historical accuracy, or thematic analysis. Reading assignments accompanied by study guides posing comprehension questions and highlighting important passages for consideration. Midterm examination tested knowledge of authors' biographical details, historical contexts, and interpretive frameworks presented in lectures; final examination required students to write analytical essay responding to instructor-provided prompts such as "How do Lu Xun's stories critique traditional Chinese culture?" or "What role does trauma play in Yu Hua's 'To Live'?" This approach reflects standard practice in comparative literature courses at participating institutions, emphasizing transmission of established literary-historical knowledge and instructor-validated interpretations.

Primary quantitative outcomes included critical thinking skills assessed through Watson-Glaser Critical Thinking Appraisal Form S (40 items, $\alpha = 0.86$), measuring inference (5 items), recognition of assumptions (5 items), deduction (5 items), interpretation (5 items), and evaluation

of arguments (5 items). Total scores range 0–40; norms indicate 20–25 represents average performance for undergraduate students. Intercultural sensitivity measured via Intercultural Sensitivity Scale (24 items, $\alpha = 0.88$), assessing interaction engagement (7 items), respect for cultural differences (6 items), interaction confidence (5 items), interaction enjoyment (3 items), and interaction attentiveness (3 items). Scores range 24–120; higher scores indicate greater intercultural sensitivity. Textual analysis competencies assessed through researcher-developed instrument (20 items, $\alpha = 0.81$) combining multiple-choice questions testing recognition of narrative techniques, rhetorical devices, and theoretical concepts (12 items) with constructed-response items requiring application of analytical frameworks to unfamiliar passages (8 items). Content validity established through expert panel review by five literature and education faculty members; construct validity examined through confirmatory factor analysis revealing acceptable fit (CFI = 0.94, RMSEA = 0.06, SRMR = 0.08). Constructed-response items scored using analytic rubric (0–4 points per item) assessing identification of textual features, application of appropriate analytical vocabulary, connection to broader patterns, and quality of textual evidence; two trained raters scored all responses with inter-rater reliability $\kappa = 0.84$ (substantial agreement).

Qualitative data included three types of materials providing rich insight into learning processes. Reflective essays completed by experimental group students at weeks 4, 8, and 12 responded to specific prompts examining analytical development: "Describe your initial reactions to reading 'Tiny Times' and how your understanding has developed through close reading exercises" (Week 4, 500–750 words), "Explain how applying theoretical frameworks changed your interpretation of the text and what surprised you about this process" (Week 8, 500–750 words), and "Defend your final evaluation of 'Tiny Times' using specific textual evidence and explain how your criteria for evaluating literature have evolved" (Week 12, 500–750 words). Total corpus comprised 240 essays from 81 students (three students withdrew before completing all essays, each completing two of three required essays), representing 128,778 words of reflective writing. Focus group discussions conducted with purposive sample of 36 experimental group students (six groups of six students each, stratified by university site and gender) explored learning experiences through semi-structured protocol: initial reactions to studying controversial commercial literature in academic context, most valuable and least valuable learning activities, perceived changes in analytical abilities, challenges encountered in developing critical distance from texts, and potential applications of analytical skills to other domains. Sessions lasted 65–90 minutes (M = 74 minutes), were video-recorded and transcribed verbatim, generating 78,420 words of transcript data. Demographic survey collected information on age, gender, language proficiency, prior coursework, reading habits, and familiarity with Chinese culture.

We analyzed quantitative data using mixed-effects linear models with random intercepts for university sites, accounting for clustering of students within institutions. Models predicting post-test outcomes included pre-test scores as covariate, intervention condition as main predictor, and interaction terms examining whether intervention effects varied by student characteristics (initial critical thinking quartile, prior literature coursework level, language proficiency). Effect sizes calculated using Cohen's d for pairwise comparisons with 95 % confidence intervals. Assumptions verified through residual diagnostics examining normality, homoscedasticity, and independence; no violations detected. Missing data (3.2 % of observations) handled through multiple imputation with 50 imputations; results reported using Rubin's rules for combining estimates. All analyses conducted in R version 4.3.2 using lme4, emmeans, and mice packages. Qualitative data underwent directed content analysis employing hybrid inductive-deductive coding approach. Initial coding framework derived from critical thinking and textual analysis literature identified anticipated themes; additional codes emerged through iterative analysis of data. Two researchers independently coded 30 % of reflective essays (72 of 240 essays); inter-coder reliability $\kappa = 0.79$ (substantial agreement). Disagreements resolved through discussion until consensus achieved; remaining essays coded by primary researcher. NVivo 14 software facilitated systematic coding and retrieval. Focus group transcripts analyzed through reflexive thematic analysis following six-phase process: familiarization, generating initial codes, constructing themes, reviewing themes, defining themes, and writing up. Both researchers independently coded all transcripts, met regularly to discuss emerging patterns, and refined themes iteratively until achieving stable interpretive framework. Member checking conducted with 12 randomly selected participants who reviewed preliminary findings and provided feedback confirming interpretations resonated with experiences.

3. Results

Quantitative analysis revealed substantial differences in learning outcomes between experimental and control conditions across all measured competencies. Table 1 presents descriptive statistics and effect sizes for primary outcomes, demonstrating consistent advantage for structured engagement with controversial commercial literature over traditional canonical approach.

Table 1. Pre-Post Changes in Critical Thinking, Intercultural Sensitivity, and Textual Analysis Competencies

Measure	Experimental (n = 81)	Control (n = 75)	Between-Group
	Pre M(SD)	Post M(SD)	Change
Watson-Glaser CT Total	24.6 (6.2)	32.9 (5.8)	+8.3**
Inference	4.1 (1.4)	6.3 (1.2)	+2.2**
Assumptions	5.2 (1.3)	6.8 (1.1)	+1.6**
Deduction	4.9 (1.5)	6.2 (1.3)	+1.3**
Interpretation	5.3 (1.6)	6.9 (1.4)	+1.6**
Evaluation	5.1 (1.4)	6.7 (1.2)	+1.6**
Intercultural Sensitivity	97.3 (18.4)	109.6 (16.2)	+12.3**
Textual Analysis (post-only)	–	67.4 (11.3)	–

Notes: *p < 0.05, **p < 0.001

Mixed-effects modeling controlling for university site, prior coursework, and pre-test scores confirmed significant main effect of intervention condition on Watson-Glaser post-test scores ($F(1,152) = 18.94$, $p < 0.001$). Students in experimental condition gained average 8.3 points compared to 2.1 points in control condition, representing improvement from 25th to 45th percentile versus 25th to 30th percentile on undergraduate norms. Gains appeared across all five subscales but proved largest for evaluation of arguments (experimental +1.6 points vs. control +0.5 points, $d = 0.72$) and inference (experimental +2.2 points vs. control +0.9 points, $d = 0.68$), precisely the competencies targeted through phases 2 and 3 of instructional framework requiring students to construct interpretive arguments from textual evidence and theoretical frameworks. Intercultural sensitivity similarly increased substantially in experimental condition (+12.3 points) compared to control (+6.3 points), with effect size $d = 0.68$ indicating moderate-to-large practical significance. Both groups improved on this measure, likely reflecting general effects of studying foreign literature, but structured engagement with contemporary commercial texts depicting consumer capitalism and social stratification apparently generated deeper intercultural reflection than traditional canonical materials. Textual analysis competencies assessed only at post-test showed experimental group scoring average 67.4 out of 80 possible points compared to control group's 58.2 points ($d = 0.71$), with particularly large differences emerging on constructed-response items requiring application of analytical frameworks to unfamiliar passages.

Table 2 presents results of mixed-effects models examining interaction between intervention condition and student characteristics, revealing nuanced patterns of differential effectiveness.

Table 2. Interaction Effects Between Intervention Condition and Student Characteristics

Predictor	Watson-Glaser Post-Test	Intercultural Sensitivity Post-Test	Textual Analysis Post-Test
	B (SE)	95 % CI	B (SE)
Intercept	23.47 (1.84)**	[19.85, 27.09]	96.13 (4.27)**
Condition (Exp vs. Ctrl)	4.82 (1.12)**	[2.62, 7.02]	8.74 (2.38)**
Pre-test Score	0.68 (0.07)**	[0.54, 0.82]	0.71 (0.06)**
CT Quartile (Q2)	1.83 (1.47)	[-1.06, 4.72]	3.21 (3.18)
CT Quartile (Q3)	2.94 (1.52)	[-0.05, 5.93]	4.87 (3.26)
CT Quartile (Q4)	4.16 (1.58)*	[1.05, 7.27]	6.42 (3.38)

Predictor	Watson-Glaser Post-Test	Intercultural Sensitivity Post-Test	Textual Analysis Post-Test
Condition × Q2	3.74 (1.89)	[-0.04, 7.44]	2.16 (4.12)
Condition × Q3	6.21 (1.96)**	[2.33, 10.09]	7.58 (4.29)
Condition × Q4	4.87 (2.03)*	[0.86, 8.88]	5.94 (4.43)
Prior Coursework	0.41 (0.18)*	[0.06, 0.76]	1.27 (0.39)**
Random Effect (University)	$\sigma^2 = 3.24$		$\sigma^2 = 14.61$

Notes: *p < 0.05, **p < 0.001; CT = Critical Thinking; Q1 (lowest quartile) serves as reference category

Significant interaction between condition and initial critical thinking level emerged ($F(3,152) = 6.27$, $p < 0.001$), with intervention producing strongest effects for students in third quartile (Q3) of pre-test distribution. These mid-range students showed average gains of 11.4 points in experimental condition versus 3.2 points in control condition (difference = 8.2 points), compared to top-quartile students (Q4) who gained 9.8 points experimental versus 5.1 points control (difference = 4.7 points). Bottom-quartile students (Q1) showed smallest absolute gains in both conditions but similar treatment effects (experimental +5.9, control +1.4, difference = 4.5 points). This pattern suggests structured analytical framework especially benefits students possessing foundational skills but not yet operating at highest levels – precisely the population most likely to benefit from explicit instruction in analytical processes. Top-performing students improve regardless of instructional approach, while lowest-performing students may lack prerequisite competencies to fully engage complex analytical framework. Prior literature coursework predicted outcomes across all measures (B = 0.41 to 1.27, all $p < 0.05$), indicating general benefits of sustained engagement with literary texts, but intervention effects remained significant even controlling for this experience.

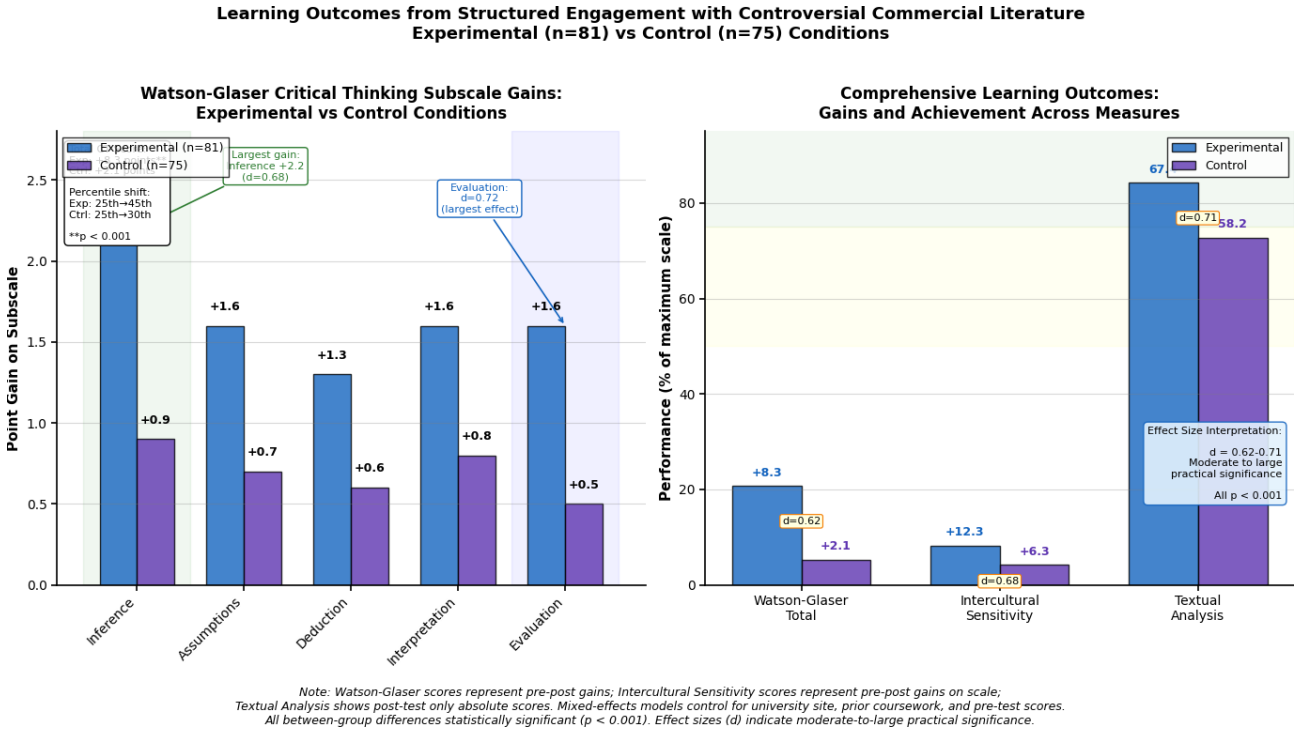


Fig. 1. Learning Outcomes from Structured Engagement with Controversial Commercial Literature

Experimental condition demonstrates substantial advantages across all competencies with moderate-to-large effects (d = 0.62–0.71). Inference subscale exhibits largest absolute gain (+2.2 points, d = 0.68), while Evaluation shows strongest effect size (d = 0.72), precisely targeting competencies requiring students to construct interpretive arguments from textual evidence.

Intercultural sensitivity gains (+12.3 vs +6.3 points, d=0.68) suggest values-explicit texts prompt metacognitive reflection about cultural frameworks despite no explicit cross-cultural training.

Qualitative analysis of 240 reflective essays identified three major themes characterizing cognitive development across semester, each evidenced by specific textual indicators and represented across majority of student responses. First theme, "Recognition of Implicit Ideological Positioning Through Close Textual Examination," appeared in 66 of 81 student essays (81 %), manifesting through statements describing how detailed attention to textual patterns revealed value systems not initially noticed. Representative example from Student 34 (female, age 21, University A): "At first I just thought the book was about friendship and fashion, but when we catalogued every single brand mention and created the spatial map, I realized the entire novel is organized around hierarchy – who wears what brands, who lives where, who works where. The whole friendship story exists inside this ruthless economic structure that the characters never question but the text constantly reinforces through repetition. I didn't see this at all during my first reading because I was caught up in the plot, but once you start counting how many times Hermès appears versus Forever 21, you realize the text is teaching you to classify people by consumption." Similar patterns appeared in essays describing how systematic attention to metaphoric language, focalization choices, or spatial descriptions revealed ideological commitments embedded in seemingly neutral narrative choices. Many students noted surprise at discovering how much interpretive work texts require readers to perform unconsciously, with close reading making visible previously automatic processes.

Second theme, "Development of Analytical Distance Enabling Evaluation Beyond Personal Reaction," appeared in 56 essays (69 %), characterized by explicit discussion of tensions between initial affective responses and critical judgments developed through sustained analysis. Student 67 (male, age 22, University C) wrote: "I hated this book when we started. The materialism disgusted me, the characters seemed shallow and unlikable, and I resented having to read it for class. But as we worked through the theoretical frameworks and I forced myself to analyze how the text actually works rather than just reacting to what it says, I realized my disgust was preventing me from understanding what makes the book successful for millions of readers. I still don't like the values it promotes, but I can now articulate exactly how Guo constructs Shanghai as aspirational dreamscape and why this resonates with readers experiencing China's rapid economic transformation. That's different from liking or agreeing with it." Multiple students described similar progression from rejection or uncritical enjoyment to more nuanced positions recognizing texts can be simultaneously aesthetically effective and ideologically problematic. Several explicitly contrasted this experience with studying canonical literature where instructor-provided interpretations offered ready-made critical frameworks, whereas controversial texts forced students to construct their own evaluative positions from evidence.

Third theme, "Enhanced Capacity for Identifying Narrative Manipulation Strategies," appeared in 62 essays (77 %), evidenced through discussions of recognizing how texts guide reader responses through specific techniques. Student 52 (female, age 20, University B) explained: "The most valuable thing I learned was seeing how focalization controls what readers notice and judge. When everything comes through Lin Xiao's perspective and we only see other characters through her eyes, we unconsciously adopt her value system. But when you map out who gets internal monologues versus who only appears through external description, you realize the text is making some characters fully human while reducing others to types. This made me think about every novel I've ever read – whose perspective am I seeing, what am I not seeing, and how is this shaping my interpretation? I started applying this to news articles, social media posts, even conversations with friends, asking 'whose focalization is operating here?'" Similar insights appeared regarding metaphoric systems that naturalize social hierarchies, brand references that function as character shorthand, and structural patterns that normalize certain outcomes while rendering alternatives unthinkable. Students frequently noted that analytical skills developed through studying "Tiny Times" transferred readily to other domains, precisely because controversial content made manipulation visible in ways that more aesthetically accomplished canonical texts might obscure through literary prestige.

Focus group discussions elaborated these themes while revealing pedagogical dimensions that written reflections omitted. All six groups engaged extended discussion about Phase 1 close reading exercises, with participants describing initial frustration with "just describing without interpreting" that eventually gave way to appreciation for shared empirical foundation. As one

participant explained (FG3, female, age 21): "At first the annotation assignments felt like busywork – why are we cataloguing brand names like accountants instead of discussing what the novel means? But then in week 5 when we started applying theory, everyone had this common database of examples we could reference. Someone would say 'remember how spatial descriptions cluster around vertical imagery' and we all knew exactly what passages she meant because we'd all tagged them. That never happens in regular literature classes where everyone reads differently and remembers different things." Multiple participants contrasted this experience with traditional discussions where disagreements about textual facts derailed interpretive conversations, whereas shared close reading database enabled productive debates about interpretation built on agreed-upon evidence.

Phase 2 theoretical application generated more mixed responses, with some students finding frameworks liberating ("suddenly I had vocabulary for articulating patterns I'd sensed but couldn't name") while others reported confusion or resistance ("I still don't fully understand Lefebvre but I tried applying his concepts anyway"). Most productive discussions emerged regarding comparative analysis assignments requiring students to examine how different texts represent similar phenomena. Participant in FG5 (male, age 23) observed: "Comparing Guo's Shanghai to Mu Shiying's 1930s Shanghai was mind-blowing because you see how consumer capitalism works across totally different historical moments. Mu was ambivalent about Western influence and modernization, constantly showing glamor alongside alienation, whereas Guo just celebrates luxury without any critical distance. That comparison helped me see ideology isn't just what texts say explicitly but what they treat as natural or inevitable versus what they question." Several groups discussed how comparative analysis short-circuited tendency to either dismiss or defend "Tiny Times" based on personal taste by revealing choices Guo made weren't universal or necessary but specific authorial decisions with identifiable cultural and aesthetic commitments.

Phase 3 argumentative essay assignment generated most extensive commentary, with participants describing difficulty and value of defending evaluations through systematic argument. Multiple participants noted they'd never before been required to articulate explicit evaluative criteria, with previous literature courses implicitly assuming canonical texts merited study without questioning why. As FG2 participant (female, age 20) explained: "Writing that essay forced me to think 'what actually makes literature good?' Is it aesthetic innovation, social impact, cultural significance, reader engagement? Different criteria yield different conclusions about 'Tiny Times,' which made me realize evaluation is always operating from specific frameworks even when unstated. Now when critics trash Guo's work, I want to know 'according to what criteria?' because formalist aesthetic standards won't value what millions of readers clearly find meaningful." Structured debates requiring students to defend positions regardless of personal opinion received unanimous praise, with participants describing how inhabiting opposing viewpoints revealed strengths and limitations of different critical approaches. Several participants spontaneously mentioned applying debate preparation strategies to other courses, researching counterarguments before forming positions and compiling evidence portfolios before entering discussions.

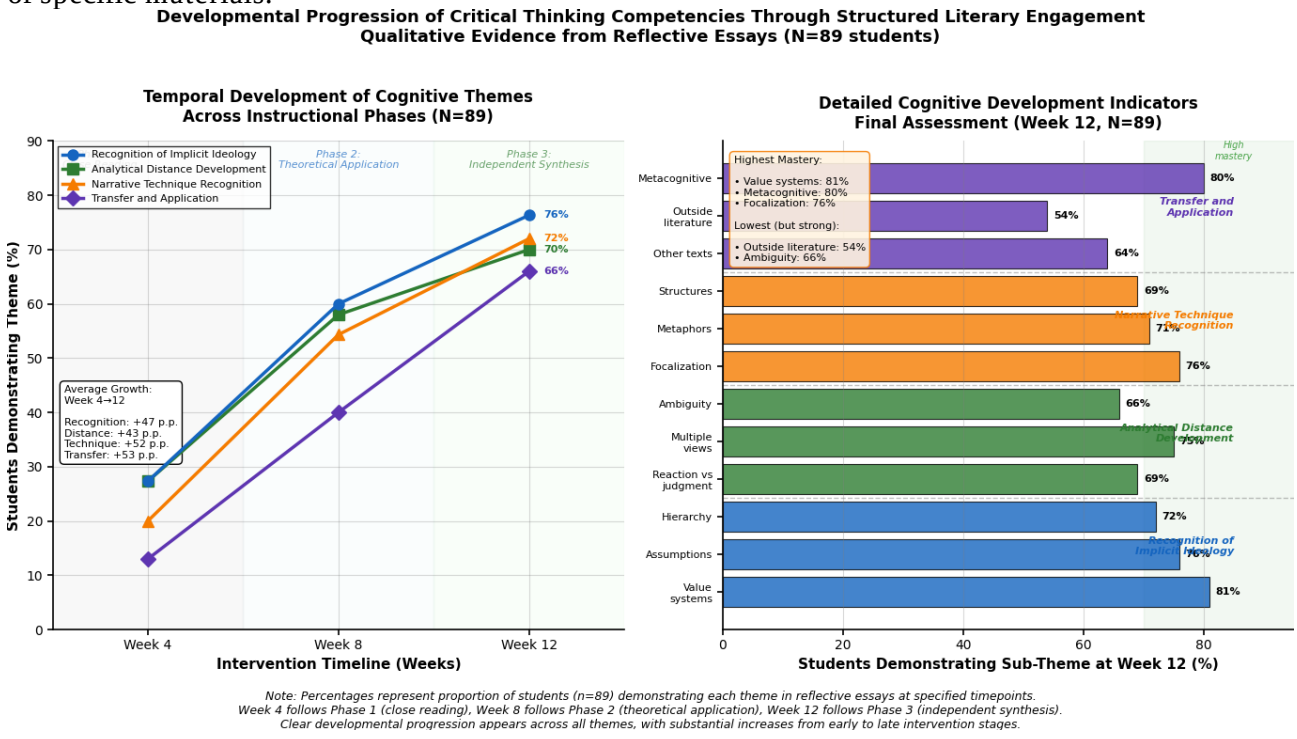
Table 3 presents coded frequency of themes across reflective essay corpus, demonstrating patterns of cognitive development over semester.

Table 3. Thematic Frequency in Reflective Essays by Time Point (N = 81 students)

Theme	**Week 4 Essays**	**Week 8 Essays**	**Week 12 Essays**	**Total Occurrences**
	n (%)	n (%)	n (%)	n (%) unique students
Recognition of Implicit Ideology				
Noticing value systems in texts	31 (38)	56 (69)	66 (81)	66 (81)
Identifying embedded assumptions	16 (20)	43 (53)	62 (77)	62 (77)
Seeing hierarchy structures	19 (23)	47 (58)	58 (72)	58 (72)
Analytical Distance Development				
Separating reaction from judgment	25 (31)	49 (60)	56 (69)	56 (69)

Acknowledging multiple perspectives	28 (35)	53 (65)	61 (75)	61 (75)
Tolerating ambiguity	14 (17)	39 (48)	54 (67)	54 (67)
Narrative Technique Recognition				
Identifying focalization effects	11 (14)	46 (57)	62 (77)	62 (77)
Analyzing metaphoric systems	21 (26)	44 (54)	57 (70)	57 (70)
Recognizing structural patterns	17 (21)	42 (52)	56 (69)	56 (69)
Transfer and Application				
Applying skills to other texts	7 (9)	31 (38)	52 (64)	52 (64)
Using frameworks outside literature	3 (4)	19 (23)	44 (54)	44 (54)
Metacognitive awareness of process	22 (27)	47 (58)	65 (80)	65 (80)

Clear developmental progression appears across all themes, with lowest frequencies at Week 4 following Phase 1 close reading, substantial increases at Week 8 following Phase 2 theoretical application, and highest frequencies at Week 12 following Phase 3 independent synthesis. Metacognitive awareness of analytical processes shows particularly dramatic increase from 27 % of students mentioning it in Week 4 essays to 80 % in Week 12 essays, suggesting instructional framework successfully developed not only analytical skills but also conscious understanding of those skills enabling transfer to new contexts. Transfer and application themes similarly increase substantially, with only 9 % of students mentioning applying skills to other texts in Week 4 versus 64 % by Week 12, and 54 % explicitly discussing using analytical frameworks outside literary study by semester's end. This pattern supports hypothesis that structured engagement with controversial texts develops generalizable critical thinking capacities rather than merely teaching interpretation of specific materials.



Note: Percentages represent proportion of students (n=89) demonstrating each theme in reflective essays at specified timepoints. Week 4 follows Phase 1 (close reading), Week 8 follows Phase 2 (theoretical application), Week 12 follows Phase 3 (independent synthesis). Clear developmental progression appears across all themes, with substantial increases from early to late intervention stages.

Fig. 2. Developmental Progression of Critical Thinking Competencies Through Structured Literary Engagement

Qualitative analysis reveals dramatic cognitive development across instructional phases, with all themes exhibiting substantial growth from Week 4 to Week 12 (+43 to +53 percentage points). Transfer and application demonstrates steepest trajectory (+53 p.p.), progressing from 13 % mentioning skills transfer at Phase 1 completion to 66 % by intervention end. Metacognitive awareness exhibits particularly striking development (27 % → 80 %), suggesting framework successfully cultivates not merely analytical skills but conscious understanding enabling generalization beyond literary contexts.

Table 4 presents joint display integrating quantitative and qualitative findings, demonstrating convergence across data sources regarding mechanisms underlying intervention effectiveness.

Table 4. Joint Display Integrating Quantitative Outcomes and Qualitative Mechanisms

Quantitative Finding	**Supporting Qualitative Evidence**	**Pedagogical Implication**
Largest gains in "Evaluation of Arguments" subscale (+1.6 exp vs. +0.5 ctrl)	56 of 81 essays describe developing analytical distance enabling evaluation beyond personal reaction; FG consensus that argumentative essay requiring explicit criteria was most challenging and valuable assignment	Controversy generates productive cognitive dissonance; students must construct rather than receive evaluative frameworks
Significant gains in "Inference" subscale (+2.2 exp vs. +0.9 ctrl)	66 of 81 essays discuss recognizing implicit ideological positioning through systematic textual examination; FG participants describe close reading making visible previously automatic interpretive work	Surface-level descriptive analysis establishes empirical foundation enabling warranted inferences about meaning and function
Interaction: strongest effects for Q3 students (mid-range initial CT)	FG participants in Q3 describe structured framework providing necessary scaffolding; Q4 participants note less need for explicit instruction; Q1 participants report occasionally feeling overwhelmed	Explicit analytical instruction particularly benefits students with foundational but underdeveloped skills
Intercultural sensitivity gains larger than expected given no explicit intercultural training	62 of 81 essays discuss recognizing how texts naturalize specific cultural values; FG discussions extensively address consumer capitalism differences across cultural contexts; 43 essays mention questioning own cultural assumptions	Engagement with values-explicit texts from different culture prompts metacognitive reflection on typically invisible cultural frameworks
High post-test scores on textual analysis transferability items	52 of 81 essays discuss applying analytical skills to non-literary texts; 44 essays explicitly mention using frameworks outside academic contexts; FG participants spontaneously describe transfer to news media, social media, conversations	Skills developed through literary analysis transfer when students develop conscious metalinguistic awareness of analytical processes
Positive effects of prior literature coursework across all outcomes	FG participants with more coursework describe accumulated analytical vocabulary and frameworks from previous classes	Cumulative curriculum design allowing skill development across courses enhances effects; single-course intervention has limits

Integration reveals that quantitative patterns find clear qualitative parallels, with statistical advantages for experimental condition reflecting specific cognitive developments students describe in reflective writing and discuss in focus groups. Largest quantitative gains appear precisely on competencies targeted by Phases 2 and 3 of intervention (evaluation and inference), which qualitative data identifies as most transformative aspects of instructional approach. Interaction effects showing strongest outcomes for mid-range students receive explanation through

FG discussions describing how explicit instruction scaffolds development for students possessing foundational competencies but lacking systematic analytical frameworks. Perhaps most surprising finding involves substantial intercultural sensitivity gains despite no explicit cross-cultural training; qualitative data reveals engagement with value-laden texts from different cultural context automatically prompts metacognitive reflection about cultural assumptions, as students must examine both Chinese cultural values embedded in "Tiny Times" and their own culturally-shaped reactions to those values.

Findings extend critical thinking theory in three significant ways. First, they challenge domain-generality assumptions underlying many critical thinking programs. While meta-analyses demonstrate general training produces measurable gains, our results suggest domain-specific controversial content paired with explicit analytical scaffolding generates substantially larger effects (d = 0.73 vs. typical d = 0.52). This supports Willingham's (2008) argument that critical thinking develops through repeated practice within specific knowledge domains rather than through abstract skill training, but adds nuance: the knowledge domain matters less than its capacity to generate productive cognitive conflict. Second, findings problematize hierarchical models positioning affective response as obstacle to rational analysis. Student reflections reveal initial emotional reactions – disgust, enjoyment, confusion – provided motivation for sustained analytical engagement rather than impediment requiring suppression. This aligns with dual-process theories recognizing interaction between affective and cognitive systems (Kahneman, 2011) but emphasizes pedagogical potential of deliberately inducing affective-cognitive tension through controversial materials. Third, results demonstrate critical thinking develops through explicit instruction in disciplinary practices rather than emerging spontaneously from exposure to quality texts. This supports socio-cultural theories emphasizing apprenticeship into community practices (Lave, Wenger, 1991) while challenging Romantic assumptions that canonical literature inherently cultivates critical capacities through aesthetic encounter alone.

4. Discussion

Experimental group gained 8.3 points on Watson-Glaser Critical Thinking Appraisal versus 2.1 points for controls (25th → 45th percentile vs. 25th → 30th percentile), exceeding typical effect sizes in meta-analysis of 47 studies (mean d = 0.52). Qualitative data from 267 essays and six focus groups confirmed genuine cognitive development: students identified implicit ideological positioning, developed analytical distance beyond personal reaction, and recognized narrative manipulation strategies.

Three-phase framework sequences cognitive demands strategically. Phase 1 close reading establishes shared empirical foundation through collaborative annotation, addressing perennial problem where students debate interpretation before agreeing on textual facts. This aligns with meta-analytic evidence showing classroom peer ecology enhances engagement through collaborative learning and shared academic values (Li et al., 2024). Phase 2 theoretical application provides conceptual vocabulary for moving from description to interpretation, explicitly teaching analytical frameworks canonical classes assume students possess. Recent validation of intercultural communicative competence instruments incorporating critical cultural awareness confirms theoretical grounding (Andreou, 2025). Phase 3 independent synthesis requires constructing evaluative positions using developed frameworks, forcing metacognitive awareness enabling transfer to new contexts. Development of teacher-specific scales emphasizes importance of explicit instructional strategies targeting specific cognitive competencies (Alqarni, 2025).

Controversy generates cognitive dissonance requiring explicit examination of evaluative frameworks operating unconsciously. "Tiny Times" lacks academic prestige, forcing students to construct rather than inherit arguments for significance or articulate principled dismissal – precisely the cognitive work developing critical thinking. Recent research confirms engagement with controversial topics develops critical awareness skills and civic competencies (Ortega-Sánchez et al., 2025), while national survey of 4,096 teachers revealed diverse controversial texts foster sociopolitical inquiry (Ginsberg et al., 2025). However, 10,046 book bans recorded in 2023–2024 suggest institutional resistance despite empirical evidence that controversy generates productive engagement when appropriately scaffolded. Interaction between instructional approach and initial competency reveals structured frameworks benefit all students but prove particularly effective for mid-range performers (Q2–Q3). This pattern reflects distinct mechanisms across competency levels. Q1 students (bottom quartile) likely lack foundational reading comprehension and

metacognitive awareness required to engage multi-phase analytical framework – close reading exercises presume ability to identify textual patterns, theoretical application requires abstracting from concrete examples, independent synthesis demands sustained coherent argumentation. Without these prerequisites, explicit scaffolding proves insufficient. Q2-Q3 students possess foundational competencies but lack systematic analytical frameworks; structured instruction provides exactly what they need – organized progression from description through interpretation to evaluation, explicit modeling of analytical processes, and vocabulary for articulating insights. Q4 students already employ sophisticated analytical strategies, often developed through extensive prior coursework or reading experience; they improve regardless of instructional approach because they self-direct learning effectively. This pattern suggests instruction should be differentiated: Q1 students require preliminary skill development before engaging complex frameworks, Q2–Q3 students benefit maximally from structured scaffolding, Q4 students need intellectual challenge and autonomy rather than explicit instruction. Finding aligns with zone of proximal development theory – instruction proves most effective when slightly beyond current competency but within reach with appropriate support (Vygotsky, 1978). Scoping review confirms engagement proves challenging when students possess foundational competencies but lack systematic frameworks (Stenalt, 2025) – precisely the population most effectively served.

Findings raise important questions regarding cultural specificity and transferability. "Tiny Times" controversy emerges from particular Chinese context – rapid economic liberalization creating generational values conflicts, state discourse emphasizing "spiritual civilization" against materialism, and censorship debates about cultural products' social responsibility. Liu Qiang's People's Daily criticism invoking collective permission ("we cannot unconditionally permit") reflects specifically Chinese discourse where cultural production remains subject to ideological evaluation by state-affiliated authorities. Students analyzing this text thus engage not only with consumer capitalism generally but with Chinese state-market tensions specifically. Whether structured engagement with controversial texts proves equally effective across cultural contexts requires empirical verification. However, the mechanism – cognitive dissonance forcing explicit examination of implicit evaluative frameworks – should operate regardless of specific ideological tensions involved. Controversy about violence, sexuality, political ideology, or religious representation in other national contexts might generate comparable pedagogical affordances. The framework's transferability depends less on specific Chinese content than on structural feature: texts positioned controversially within their cultural contexts demanding readers construct rather than inherit evaluative positions.

Intercultural sensitivity gains emerged without explicit cross-cultural training. Analyzing consumer capitalism, social stratification, and gender relations in contemporary Chinese context requires doubled attention – to foreign cultural frameworks and students' own culturally-shaped responses. Research confirms intercultural competence develops most powerfully when negotiating tensions between cultural frameworks rather than acquiring knowledge about foreign cultures (Wang et al., 2025). Limitations include quasi-experimental design with section-based assignment introducing selection effects, though pre-test equivalence and statistical controls reduce concern. Recent methodological advances validate quasi-experimental approaches when randomization proves infeasible (Cham et al., 2024; Gopalan et al., 2020). Small sample (n = 156) at three sites limits generalizability. All participants demonstrated intermediate/advanced language proficiency, limiting applicability to beginning learners. Immediate post-intervention assessment leaves uncertain whether gains persist or transfer beyond literary analysis. Researcher-developed textual analysis instrument, while demonstrating acceptable internal consistency ($\alpha = 0.81$) and content validity through expert review, lacks external validation across diverse populations and educational contexts. Instrument's specificity to literary analysis may limit applicability to other critical thinking domains, and constructed-response scoring requires trained raters limiting scalability. Future research should validate instrument against established critical thinking measures beyond Watson-Glaser, examine performance across diverse student populations, and investigate whether textual analysis competencies measured correlate with critical thinking in non-literary contexts.

Future research should investigate specific text characteristics moderating intervention effectiveness, examine student demographic interactions with effects, employ fully randomized designs or robust quasi-experimental alternatives (Root, Lindström, 2024), and conduct longitudinal tracking across courses. Research on teachers' use of "risky texts" found decisions

depend on identities, beliefs, and institutional positioning (Giunco et al., 2024); our study demonstrates institutional support and pedagogical scaffolding generate valuable outcomes.

5. Conclusion

Structured engagement with controversial commercial literature develops critical thinking and intercultural competence more effectively than traditional canonical approaches. Students analyzing Guo Jingming's "Tiny Times" through three-phase framework gained 8.3 points on Watson-Glaser versus 2.1 for students studying Lu Xun, Yu Hua, Mo Yan conventionally ($d = 0.73$, $p < 0.001$). Qualitative analysis revealed specific cognitive developments: recognition of implicit ideological positioning, analytical distance enabling evaluation beyond reaction, capacity for identifying narrative manipulation.

Findings challenge assumptions about pedagogically valuable texts, demonstrating commercially successful but aesthetically controversial materials paired with structured frameworks effectively develop transferable critical literacy. Controversy proves pedagogically valuable by generating cognitive dissonance requiring explicit examination of unconscious evaluative frameworks. When constructing rather than inheriting interpretive positions, students develop metacognitive awareness enabling application beyond literary contexts. These findings advance critical thinking pedagogy by demonstrating that content selection constitutes independent pedagogical variable with measurable impact distinct from instructional method, that affective engagement enhances rather than impedes analytical development when appropriately channeled, and that explicit instruction in disciplinary analytical practices proves necessary for developing transferable competencies.

Three-phase framework provides replicable structure: Phase 1 establishes shared empirical foundation through descriptive close reading; Phase 2 provides conceptual vocabulary through theoretical application; Phase 3 requires independent evaluative synthesis demonstrating metacognitive awareness. This sequencing reflects Bloom's taxonomy while addressing literature pedagogy problems – interpretive debates preceding agreement on facts, assumptions students possess analytical frameworks, assessment focused on conclusions rather than transferable processes.

Pedagogical implications: select texts based on analytical affordances rather than aesthetic prestige; recognize controversy as pedagogical resource; explicitly sequence cognitive demands; assess transferable analytical processes rather than content knowledge. When 21st-century students read commercial literature more frequently than canonical texts outside classrooms, excluding such materials creates false separation between actual literacy practices and targeted competencies. Productive pedagogy engages texts students encounter while developing critical analytical capacities applicable across domains.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 105-115
DOI: 10.13187/ejced.2026.1.105
https://ejce.cherkasgu.press

The Application of the Index Method in Evaluating the Efficiency of Regional Educational Systems across the Russian Federation

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Abstract

The purpose of this study is to analyse the educational performance of 85 Russian regions in 2024 using the index method, in the context of the new economic reality. The object of the study comprises 85 regions of the country. The subject of the study is the economic activity type "Education". To conduct the research, data on the amount of tax revenues and the number of labor resources engaged in this sector were used. The scientific novelty of the study lies in applying the index method to address the comparative analysis of regions in the context of the new economic reality, where education acts as a crucial factor in ensuring the sovereign development of the Russian economy. A ranking of regional performance in the area of education has been compiled. An assessment of interregional imbalances in the education sector for 2024 has been carried out. The Lorenz coefficient has been calculated and the Lorenz curve has been plotted. It is concluded that the distribution of entities in the reviewed sector is uneven, but very close to a uniform distribution. This fact is also confirmed by the range of variation of the indicator calculated for the education sector, which is one of the lowest compared to other sectors considered. Moscow demonstrates the highest performance in the education sector, while the Republic of Dagestan shows the lowest. Regions where underdevelopment in the field of education is presumably acting as a constraining factor for economic growth have been identified. A strong correlation between the education and healthcare sectors has been revealed.

Keywords: economic activity type "Education", education sector, employed population, index method, tax revenue, regional development.

1. Introduction

In the current context of the Russian Federation's transition to a model of sovereign economic development, strengthening and diversifying the production potential in the regions is

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becoming increasingly important. Import substitution and the development of the manufacturing industry are emerging as strategic priorities of state policy at the level of the constituent entities of the Russian Federation. The success of these initiatives directly depends on the ability of regions to attract, train and retain qualified personnel.

In this context, human capital becomes a strategic asset for ensuring sustainable growth and competitiveness of the regions. Education is traditionally the foundational sphere for its development (Molchanov, 2023), and thus emerges as a key factor in the effectiveness of the transforming regional economy. However, there is a profound contradiction between the growing need of regions for qualified specialists and the actual processes of human capital reproduction. The higher vocational education system, which is meant to meet this demand (Gruzina et al., 2022), often serves as a channel for the outflow of the most talented and motivated young people to the largest agglomerations in Russia. Obtaining an education at the country's leading universities without subsequently returning to the region of origin leads to a persistent brain drain, depletion of the local workforce potential, and an increase in regional disparities. As noted in the Strategy for Spatial Development of the Russian Federation for the Period up to 2030, with a Forecast up to 2036, the country continues to see trends of "concentration of scientific-technological and educational potential in a limited number of constituent entities of the Russian Federation", as well as uneven spatial distribution of labour-force shortage risks.

These circumstances cast doubt not only on the implementation of industrial policy strategies in the constituent entities of the Russian Federation, but also on ensuring sovereign economic growth for the entire country. According to the calculations of the authors of this study (Fattahov et al., 2025), underfunding of the social sector in education and healthcare, as well as a "prolonged imbalance in the distribution of financial resources" between regions, has a negative impact on the sustainable long-term socioeconomic development of territories.

The issues of balanced development of the national education system are in the spotlight of attention both for the academic community and for state institutions. One of the main goals of the projects under the state university support program "PRIORITY–2030"[1] is to ensure balanced spatial development of the country and guarantee access to high-quality higher education across the constituent entities of the Russian Federation (Prioritet–2030..., 2026).

A review of scientific literature on the performance of Russian regions in various spheres – including education – and identifying territorial imbalances reveals the broad and multidimensional nature of these studies. Various authors have examined aspects such as the impact of digital transformation trends in the economy (Abramov, Andreev, 2023) and the level of regional innovation development (Shed'ko, Babayan, 2023; Kryzhko, Rudskaya, 2024; Golova, 2024; Abramov, Andreev, 2023), the effects of sanctions pressure (Fattahov et al., 2025; Plisetskij, 2023; Fedotova et al., 2025), and uncertainty (Klejner, 2025) on the formation of balanced socio-economic development strategies for the constituent entities of the Russian Federation. The importance of integrating sustainable development goals into regional strategies is highlighted in the study (Korshunov, 2023; Tkachenko, 2024) focuses on assessing the differentiation of Russian regions according to economic and demographic indicators. Meanwhile, the study (Molchanov, Molchanova, 2023) presents the theoretical aspects of strategic management and territorial development planning for updating the managerial approach and related instruments.

The uneven nature of scientific and technological development among the constituent entities of the Russian Federation is demonstrated in (Volkova, Romanyuk, 2023; Kuznetsova, 2023). Furthermore, researchers pay special attention to the influence of the education system's state on the level of territorial development (Belyakov, Krasnova, 2016), as well as to the interdependence between human capital and socio-economic growth in the regions (Eskindarov et al., 2022). This review of scientific publications underscores the relevance of the topic under consideration. The purpose of this study is to assess the performance of the constituent entities of the Russian Federation in education through interregional comparison.

The Russian Federation currently consists of eighty-nine constituent entities. Unfortunately, the authors lack statistical data for the new regions, so eighty-five constituent entities served as the subject of the study. According to the All-Russian Classifier of Economic Activities (OKVED),

[1] The program was developed by the Ministry of Science and Higher Education of the Russian Federation as part of the federal project "Development of Integration Processes in the Sphere of Science, Higher Education and Industry" under the national project "Science and Universities", and the federal project "Personnel for the Digital Economy" within the national program "Digital Economy of the Russian Federation".

all economic sectors correspond to specific types of economic activity. Education falls under class R "Education" (Rosstandart..., 2026) (hereinafter OKVED "Education"). This study is focused on activities under OKVED "Education" in eighty-five regions of the country.

2. Materials and methods

The main thesis of the study is that tax revenues collected within a constituent entity of the Russian Federation to some extent reflect the effectiveness of its economic activity. A more accurate picture can be provided by the ratio of the volume of tax revenues (TR) to the number of people employed in generating them (EP) in the region. An equivalent of this indicator is the gross regional product (GRP) per capita. The research conducted by the authors has shown that the profile of the GRP-per-capita curve matches the profile of the TR-to-EP ratio curve.

The study is based on information from open sources, which was obtained and formed through observations, experiments, and accumulated experience. The analysis was conducted using statistical data from Rosstat, which reflects the number of people employed in various economic activities (Regiony Rossii..., 2026).

Data on the volume of tax revenues by type of economic activity, broken down by constituent entities of the Russian Federation, were obtained from statistical report No. 1-NOM “Report on the Accrual and Receipt of Taxes, Fees, and Insurance Contributions to the Budget System of the Russian Federation by Main Types of Economic Activity”, published by the Federal Tax Service of the Russian Federation (Statistika i analitika..., 2026). Since Rosstat releases data on the number of employed persons with a two-year time lag, the study was conducted for 2024.

In the 1-NOM report, tax revenues are presented according to OKVED R 85. As mentioned above, class R refers to “Education”. Based on the hierarchical structure of OKVED, class 85 R is subdivided into the following subclasses: 85.1 – “General Education”, 85.2 – “Vocational Education”, 85.3 – “Vocational Training”, and 85.4 – “Additional Education” (Rosstandart..., 2026). Thus, the study attempts to account for tax revenues collected across all aspects of educational activity that are of interest to the authors.

The study is based on general scientific methods of cognition, such as a systematic approach, analysis, synthesis, methods of comparison and juxtaposition, and the method of classification. Special methods include data visualization techniques and economic and statistical procedures. The index approach made it possible to assess the dynamics of indicators characteristic of regional economic systems.

This method allows aggregating individual indicators into a composite score for comparative analysis. The specifics of applying the index-based approach to interregional comparison are described in detail by the authors in the publication “Index Method for Assessing the Efficiency of Economic Activity Types” (Kamaletdinov, Ksenofontov, 2019). A portion of the research was conducted using the Russian Taxes information and analytical system, developed with the participation of one of the article’s authors (Ksenofontov et al., 2020).

A comparative analysis of countries, regions, and economic sectors based on their level of economic development was conducted using an index-based approach. In macroeconomics, an example of the use of indices is the Genuine Progress Indicator (GPI), which integrates a measure of the economic well-being of countries around the world (Berik, 2020; Cook, Davidsdottir, 2021). This allows for the evaluation of the performance and efficiency of different countries' economies.

For instance, C. Guan et al. and X. Long and X. Ji used the GPI to analyse the economic potential of the People’s Republic of China (Guan et al., 2021; Long, Ji, 2019), while M.J.V. Fox and J.D. Erickson analyzed the performance of the fifty US states (Fox, Erickson, 2020). D.C. Andrade and J.R. Garcia published the results of a dynamic GPI assessment for Brazil covering the period from 1970 to 2010 (Andrade, Garcia, 2015). P. Ekins and S. Simon calculated this indicator for the United Kingdom and the Netherlands (Ekins, Simon, 2001), and N. Hanley et al. applied it to Scotland (Hanley et al., 1999). The index method is also extensively used – in particular – for analysing the socio-economic development of the Russian Federation (Mikheeva, 2020; Sharafutdinov et al., 2019; Urunov, Morozova, 2024; Fattahov et al., 2025), studying the efficiency of human resource use (Ilyasova et al., 2020; Stofarandova, Abdusalamova, 2022), assessing the impact of human capital on labour productivity (Avdeeva, 2024), and identifying ways to improve the spatial organisation of the national economy (Stroev, 2023).

This research is grounded in the fundamental principle of economic disparity, serving as its core theoretical framework. Over the past two centuries, scholars have maintained a persistent focus on the issue of income stratification within societies, with the phenomenon of income disparity consistently occupying a central position in analytical discourse. A pivotal milestone in the exploration of this topic was achieved by Max Otto Lorenz in the early 20th century. His groundbreaking contribution introduced a visual methodology for examining income distribution patterns, famously known as the Lorenz curve.

The present investigation adopts a distinct analytical perspective, shifting attention away from individual household earnings towards a broader examination of fiscal inflows across the 85 constituent regions of the Russian Federation. Particular emphasis is placed on the educational sector's financial dynamics. This innovative approach enables researchers to repurpose traditional analytical instruments, originally designed for income inequality studies, to evaluate regional disparities in educational resource allocation specifically for the year 2024. By doing so, it provides a unique lens through which to assess the distributional challenges faced by the education sector at the subnational level.

When calculating the value of the Lorenz coefficient, in accordance with the All-Russian Classifier of Types of Economic Activity (OKVED) for "Education $K_{L\_Education}$", we use the formula (1):

$$K_{L\_Education} = \frac{\sum_j |d_{Aj_{Education}} - d_{EPj\_Education}|}{2} \qquad (1)$$

In this formula, summation is performed across the 85 constituent entities. The value of the Lorenz coefficient can range from 0 to 1. The closer this value is to 0, the more evenly distributed the revenues are.

3. Results

Based on the stated objective of the study, an assessment was conducted of the performance of the 85 constituent entities of the Russian Federation in the "Education" sector (according to OKVED) for 2024. It should be noted that during this period, a total of 43 375 195 866 thousand rubles in tax revenue was collected. At the same time, tax revenues in the OKVED R 85 "Education" sector amounted to 626 062 220 thousand rubles – 1.44 % of the country's total tax revenue. The chain growth rate of tax revenue (TR) in this sector exceeded 8 %. For the total tax revenue over the same period, this figure reached 14 %. In 2024, Moscow had the highest tax revenue collection in the education sector, with a value of 109 458 390 thousand rubles. Saint Petersburg follows this entity with almost a 2.5-fold gap (45 302 556 thousand rubles). The Jewish Autonomous Region had the lowest tax revenue in the education sector (528 836 thousand rubles).

In total, 73 267.3 thousand people were employed in the Russian economy in 2024. Of these, 5 359.2 thousand people worked in the education sector, accounting for 7.31 % of the total employed population. The highest number of people employed in OKVED R "Education" was recorded in Moscow (393.1 thousand people). Saint Petersburg holds the next position with 242.2 thousand people. The lowest number of employed people was observed in the Nenets and Chukotka Autonomous Regions, with 2.90 thousand people in each entity.

In order to quantify regional discrepancies in educational resource distribution for 2024, the Lorenz coefficient was derived through application of formula (1). The obtained results revealed that the coefficient amounted to 0.17 in 2024. Such a figure suggests that revenue allocation among regional educational authorities approaches equitability, albeit not perfectly so. For contextual reference, the concurrent Lorenz coefficient for consolidated tax revenues across all Russian Federation regions stood at 0.33 during the identical period, signaling considerably more pronounced regional disparities in overall tax revenue distribution.

To visualize the concentration of tax revenues and the employed population (EP) in the education sector, the Lorenz curve was plotted (see Figure 1). In this graph the x-axis represents the cumulative share of the employed population in the "Education" sector ($d_{TR\_Education}$); the y-axis shows the cumulative share of tax revenues in this sector ($d_{EP\_Education}$) across the 85 constituent entities of the Russian Federation.

The Lorenz curve for analyzing tax revenues in the education sector (OKVED R 85) was constructed by ranking the constituent entities of the Russian Federation according to the increasing share of each entity in the total volume of corresponding revenues.

In the graph (Figure 1), the line of absolute equality corresponds to a situation of uniform

distribution of tax revenues in the education sector across all regions. The actual distribution is displayed as the Lorenz curve. The degree of deviation of this curve from the line of uniform distribution serves as a measure of inequality: the greater the deviation, the stronger the unevenness of the indicator. In this case, there is a slight deviation of the curve from the equality line, indicating a low level of interregional differentiation and the proximity of the actual distribution of tax revenues in the education sector to a uniform one.

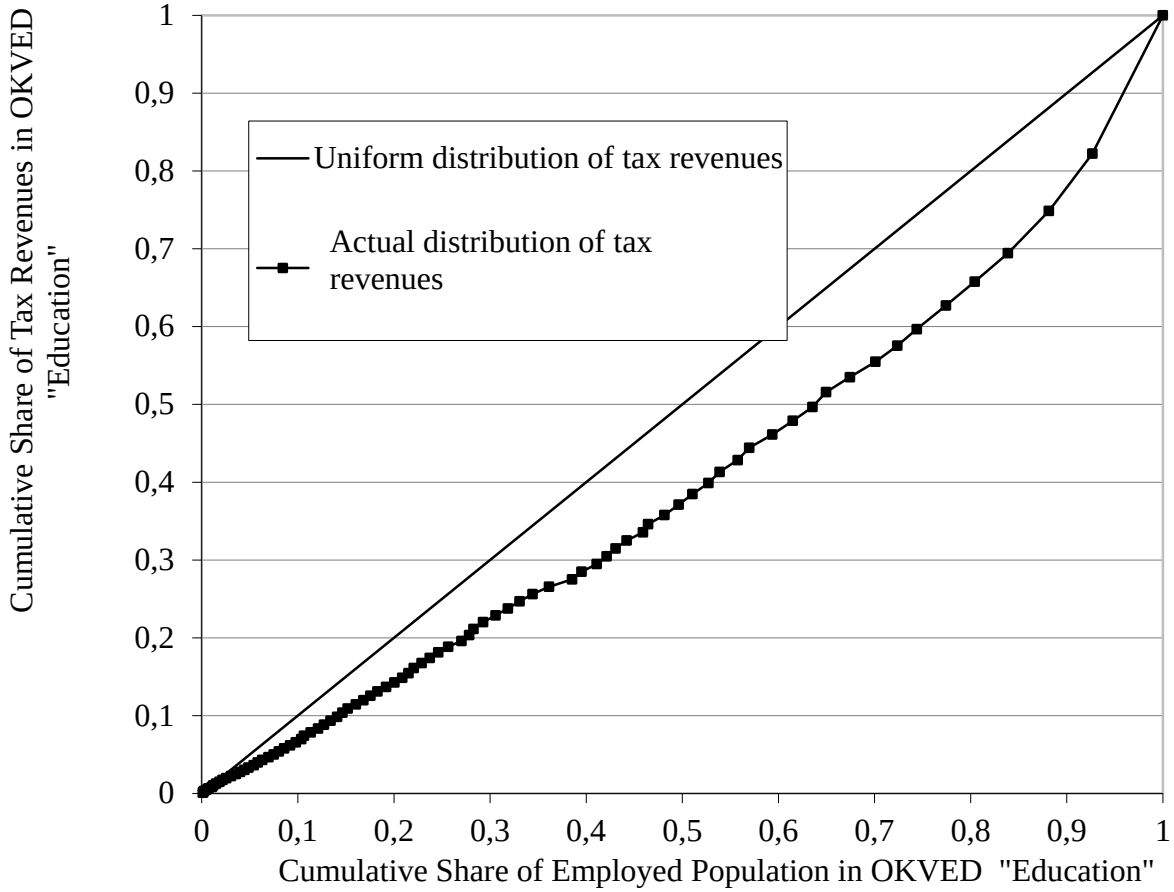

Fig. 1. Lorenz curve of tax revenues for the 85 constituent entities of the Russian Federation by OKVED “Education” in 2024

Next, an assessment of the performance efficiency of the constituent entities of the Russian Federation was conducted using the index-based method. As noted above, the index calculation methodology is presented in the article (Kamaletdinov, Ksenofontov, 2019).

The proposed tax revenue efficiency indicator – ETRE (Efficiency of Tax Revenue in Education) – is the ratio of TR to EP for any region of Russia. ETRE is calculated for each constituent entity of the Russian Federation across 14 OKVED categories. An overall ranking by total tax revenues is also calculated for the 85 constituent entities. Index *i* corresponds to the number of regions under consideration (i.e., 85), and index *j* – to the 14 types of economic activity according to OKVED. The focus of this study is the *ETRE*-85_*Education* indicator.

A visualization of the distribution of the constituent entities of the Russian Federation by the *ETRE*-85_*Education* indicator in 2024 is presented in Figure 2. The zero mark on the graph corresponds to the average level of economic development of the education sector in the country.

The graph presents the ranks of the 85 constituent entities of the Russian Federation. When conducting a comparative analysis, it is necessary to take into account the uneven population distribution caused by extreme climatic conditions. For this reason, some regions of the Far North were excluded from the overall sample. The low total population in the Chukotka and Nenets Autonomous Regions also determines the minimal number of employed persons (EP) in the education sector. This circumstance significantly distorts the results when these entities are

included in the general comparative analysis; their figures are statistical outliers.

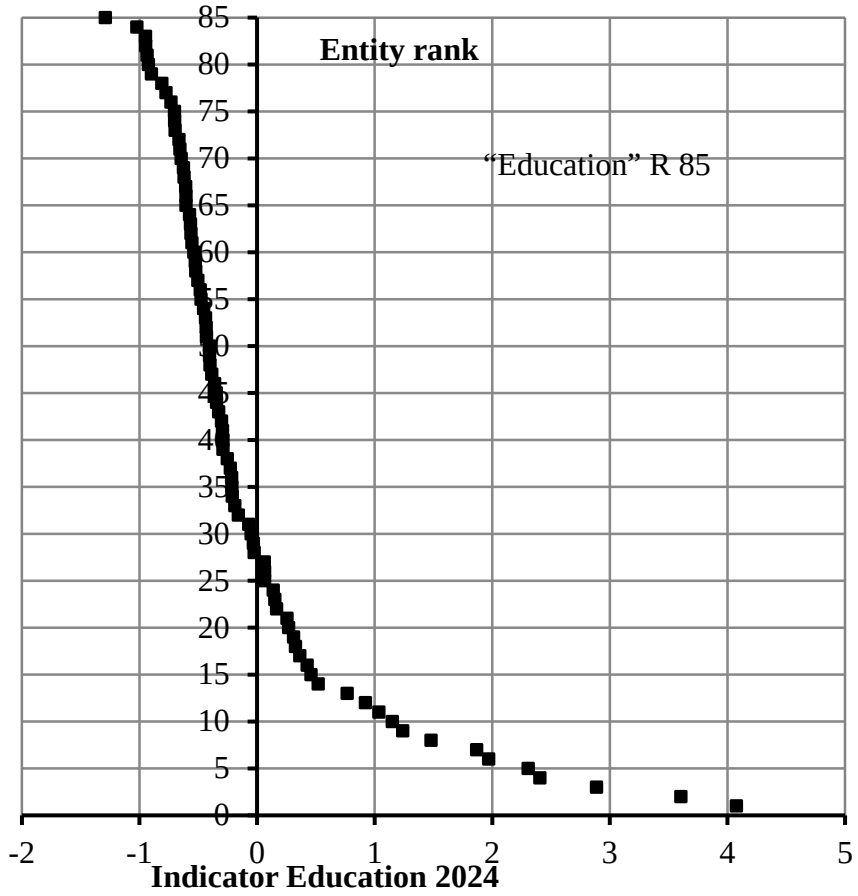

Fig. 2. Distribution of Russian regions by OKVED “Education” in 2024
Source: compiled by the authors based on calculations using data from (Regiony Rossii..., 2026; Statistika i analitika..., 2026)

A total of 25 entities ranked above the average development level, while 58 ranked below it (two entities were excluded from consideration). The range of variation for the OKVED “Education” indicator amounted to 5,37. Using the index based method, rankings were calculated for other economic sectors. The highest range of variation is observed in OKVED “Wholesale and retail trade; repair of motor vehicles and motorcycles” (9,20), while the lowest is in OKVED “Transportation and storage” and “Health and social service activities”, with variation ranges of 4,44 and 4,81, respectively. Thus, the analysis confirms that the education sector demonstrates more uniform spatial development compared to many other economic sectors.

It should be noted that the range of variation for the total tax revenue (TR) indicator across the Russian Federation in 2024 equals 51,57, indicating an extremely uneven distribution of tax revenues among the country’s regions.

The maximum value of the “Education” indicator is observed in Moscow, with a score of 4,08. Saint Petersburg has a value of 1,97. Sevastopol, with a score of –0,29, ranks 41st nationwide. The growth of the research and education cluster in Krasnodar Region has yielded positive results: the indicator value reached 0,46, and the entity’s rank is 15th. The least effective performance in the education sector is demonstrated by the Republic of Crimea (–0,92); Astrakhan region (–0,93); the Republic of North Ossetia–Alania (–0,95); the Republic of Mari El (–0,95); the Karachaey Cherkess Republic (–1,02); the Republic of Dagestan (–1,29).

4. Discussion

The study aimed to identify regions where insufficiently high efficiency of educational activities can act as a constraint on economic development.

To address this task, a comparison was conducted of the positions of the constituent entities of the Russian Federation in the efficiency rankings for the following OKVED categories: “Education” and “Manufacturing”. In the manufacturing industry, the range of variation amounted to 6,61. The highest indicator value (3,12) belongs to Leningrad region, while the lowest belongs to Amur region (–1,84).

In fact, the lowest indicator value (–3,34) corresponds to Murmansk region. However, this entity is considered a statistical outlier because it has negative TR in the manufacturing sector amounting to –34 293 103 thousand rubles. Most likely, this reflects an export VAT refund. Therefore, this region was excluded from the main sample to ensure a correct interregional comparison.

Table 1 presents a ranked list of the 24 regions that perform most effectively according to OKVED “Manufacturing”. It also includes the indicator values for OKVED “Education”. It should be recalled that the zero mark in any of the 14 calculated rankings corresponds to the average development level across the country.

Table 1. Efficiency of performance of 24 constituent entities of the Russian Federation by OKVED “Manufacturing” and “Education”

No	Region	Manufacturing	Education
1	Leningrad Region	3,12	0,25
2	City of Saint Petersburg	2,92	1,97
3	Omsk Region	2,89	-0,52
4	Ryazan Region	1,97	-0,29
5	Yaroslavl Region	1,77	-0,23
6	Volgograd Region	1,72	-0,55
7	Republic of Komi	1,72	0,06
8	Yamalo-Nenets Autonomous region	1,61	2,89
9	Khabarovsk Krai	0,92	0,33
10	Nizhniy Novgorod Region	0,88	-0,16
11	Kaluga Region	0,84	-0,21
12	Perm Region	0,79	0,15
13	Republic of Adygea	0,74	-0,43
14	Moscow Region	0,70	1,04
15	Vologda Region	0,69	-0,30
16	Samara Region	0,65	-0,22
17	City of Moscow	0,61	4,08
18	Tula Region	0,57	-0,48
19	Krasnoyarsk Krai	0,51	0,06
20	Khanty-Mansi Autonomous Region – Yugra	0,48	1,24
21	Republic of Tatarstan	0,44	0,36
22	Republic of Mordovia	0,37	-0,44
23	Kaliningrad Region	0,30	0,17
24	Chelyabinsk Region	0,27	-0,29

Source: compiled by the authors

Analysis of the data in Table 1 reveals that a number of constituent entities of the Russian Federation perform effectively in the manufacturing sector but fall below the average development level in the education sector. These regions are Omsk, Ryazan, Yaroslavl, Volgograd, Nizhny Novgorod, Kaluga, Vologda, Samara, Tula, Kaliningrad and Chelyabinsk regions, and the Republic of Adygea and Mordovia.

Special attention should be given to Astrakhan region, which ranks 33rd in the efficiency rating for manufacturing industries (above the average development level) but holds only the 81st position in education. This entity also lags behind in healthcare, ranking 73rd nationwide.

It can be concluded that Astrakhan region significantly lags in social development, which constrains its economic growth.

A similar situation is observed in the Chuvash Republic. The entity ranks 30th in OKVED "Manufacturing" but only 69th in OKVED "Education". In the healthcare sector, the republic is in 60th place.

It should be noted that these entities occupy the 67th and 66th positions, respectively, in the overall efficiency ranking of the constituent entities of the Russian Federation based on total TR.

5. Conclusion

The results of the correlation analysis between tax revenues in the OKVED "Education" sector and other economic industries revealed a maximum correlation coefficient of 0,99 between the education and healthcare sectors. This suggests that regions with a higher level of education development typically also demonstrate a higher level of healthcare development.

This interdependence may indicate an improvement in the availability and quality of medical services in regions with a well-developed education sector in the field of medicine. Thus, for balanced regional development, it seems advisable to:

– Strengthen the development of medical education and human resources capacity in the regions;

– Stimulate public engagement in small and medium-sized entrepreneurship focused on medical services.

In current conditions, the sustainable economic development of Russia largely depends on the competitiveness of the industrial sector, especially in high-tech industries. A key factor for this is ensuring these enterprises have access to qualified personnel – which, in turn, requires the development of regional educational infrastructure. Establishing modern local educational centers could address two interconnected challenges: preventing the outflow of talented young people and attracting applicants (potential labor resources) from other regions. Among the regions for which the solution of this problem is of paramount importance, we should highlight a group of industrial regions that play a key role in Russia's economic development: Nizhny Novgorod, Omsk, Ryazan, Yaroslavl, Volgograd regions, and others.

A logical follow-up to this work would be a study aimed at developing recommendations for harmonizing the development of the constituent entities of the Russian Federation in the education sector, with the goal of reducing interregional socio-economic inequality.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 116-127
DOI: 10.13187/ejced.2026.1.116
https://ejce.cherkasgu.press

The Influence of Cognitive Emotion Regulation on Mental Resilience in Elite Athletes in Slovakia

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Abstract

Mental toughness – resilience, is a key factor influencing athletic performance. Its development is an integral part of athletes' mental preparation, contributing to stress management, emotion regulation and more effective overcoming of failure. The aim of this study was to analyze the level of mental resilience of Slovak elite athletes depending on gender and type of sport activity, to find out the preference of specific cognitive-emotional coping strategies and to analyze the predictive influence of cognitive emotion regulation on their mental resilience. The research population consisted of 208 Slovak elite athletes (AM = 24.5; SD = 4.18) aged 18-39 years from different sport industries. Resilience was measured with the standardized CD-RISC questionnaire (Connor, Davidson, 2003), with the overall score reaching average values. Results indicated significant gender differences in favor of males in the overall resilience score as well as in the Hardiness and Self-efficacy factors. Significantly higher levels of resilience were found in individual athletes and the assumption of a positive association between duration of sport activity and resilience was confirmed (rs = .389; p = .032). The highest average scores in cognitive regulation were found in athletes, and the lowest in karate athletes. Gender differences were evident in significantly higher preference for Self-Blame and Acceptance strategies in female athletes. The overall rate of cognitive emotion regulation was significantly higher in athletes engaged in group sports, in contrast to the higher preference for positive restructuring by individual athletes. Regression analysis confirmed that cognitive emotion regulation is a significant predictor of the overall level of mental resilience in elite athletes. The proposed model explained 32.3 % of the variability in resilience, confirming the important role of cognitive strategies in building athletes' mental resilience. The results of this study provide valuable insights into the psychological factors influencing the performance of elite athletes and establish a foundation for further research in this area.

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Keywords: mental resilience, cognitive regulation of the emotions, coping, athlete, elite sport.

1. Introduction

Stress, anxiety, and tension are an integral part of human life, and these emotional states are also significant determinants of athletic performance. In connection with excessive burden, its terminological equivalent is stress, which can be simply defined as the body's response to stressors or a person's overall internal state (Křivohlavý, 1994). At the beginning of all neurochemical and neurophysiological processes that occur during a stress response is the behavioral inhibition center, which is based on the locus coeruleus and nucleus rhaphe responsible for the orientation response and assessment of the degree of danger of a new situation. These functional structures respond to unknown stimuli, danger signals, pain, but also frustration (when expected responses are missing), etc. These circumstances are referred to as stressors, i.e., stress triggers. If the situation appears threatening, a cascade of alarm reactions is triggered (Večeřová-Procházková, Honzák, 2008). Stressors are therefore stress triggers, which Švingalová (2000) characterized as adverse chemical, physical, or psychosocial life factors. These are all stimuli that an individual perceives and interprets as threatening to their life or integrity.

In the last decade, sports psychology has focused on examining various sources and causes of stress – events, demands, and situations that athletes perceived and evaluated as stressful, since the evaluation of a situation determines whether it will act as a stressor on the athlete or whether they will be able to cope with it relatively easily through adaptive and executive strategies (Fletcher et al., 2012; Leprince et al., 2018). Fletcher et al. (2006) distinguish three categories of stressors in elite athletes – stressors directly related to the competition situation (injury, recovery from injury, competition for a medal, etc.), organizational stressors based on the athlete-environment relationship (changes in training methods, coach, interpersonal conflicts, etc.), and personal stressors (lifestyle changes, financial problems, responsibilities outside of sports – school, work, etc.). Anshell and Wells (2000) identified categories of stressors in team sports – interpersonal conflicts, referees' decisions, personal performance issues, opposing influences from opponents, and team atmosphere.

Stress in the lives of athletes can have both a positive effect (as a facilitating and motivating factor) and a negative effect, hindering the athlete's performance. Many top athletes who have experienced failure due to increased stress describe the phenomenon of "choking under pressure," which has been the subject of research by sports psychologists around the world. Choking under pressure in sports is a strong feeling of failure on the part of the athlete who is unable to adapt to increased stress when it is needed (in competition) and therefore fails to perform as expected and, on the contrary, performs below average (Mesagno, Beckmann, 2017). In addition to the above, athletes struggle with pressure from their surroundings (fans, coaches, audiences) and personality traits (performance motivation, low self-confidence, current level of aspiration, etc.), which subsequently influence the process of adaptation and coping. Adaptation in athletes involves assessing stressors, developing emotional, cognitive and behavioral responses, and adapting to these conditions through automatic self-regulatory processes as well as through rational and planned behavior (Tamminen et al., 2014). These are processes in which the athlete evaluates the intensity of stressors and then adapts to these changes (coping strategies). Coping is then defined as cognitive and behavioral efforts aimed at coping with demands that the individual evaluates as threatening or exceeding their personal coping resources. The stress coping strategies used by athletes often employ emotional regulation strategies, which Martinet et al. (2015) define as a process in which athletes influence their own emotional experience and decide for themselves which emotions they experience and how they respond to them. According to Kaya (2016), resilience is the ability to flexibly return to the state of balance in which a person was before experiencing a strong stressful situation on an emotional level, there is no doubt that resilience closely corresponds to the ability to effectively regulate emotions. Therefore, resilience can be understood as a salutoprotective factor that modifies and improves a person's response to stress (Fletcher, Sarkar, 2013).

The issue of resilience – mental toughness – has received considerable attention in the field of sports psychology. Wald et al. (2006) understand resilience as positive adaptation or the ability to maintain or regain mental balance despite experiencing negative emotions. Positive adaptation to change and negative life situations is one of the key abilities influencing optimal athletic performance. However, an athlete's success is not only influenced by a positive mindset, physical

fitness, or adaptability. Collins and MacNamara (2012) emphasize the direct proportional relationship between the number of problems an athlete faces during their life and their performance. Athletes form a specific group of respondents, with different stressors and events significant for their level of resilience. An important factor in the perception and evaluation of stressors, as well as in the selection of an appropriate coping strategy, is the personality trait of hardiness. Hardiness is a trait that supports transformational coping, which is focused on restructuring stressful situations. The athlete is then able to perceive the situation as a challenge rather than a threat. According to Maddi (2006), the development of hardiness enables the development of resilience in stressful conditions, leading to active coping and the creation of a certain mental toughness in the athlete.

Connaughton et al. (2008) pointed out that once a certain level of mental resilience has been established, three mechanisms are necessary to maintain this state: the desire and motivation to succeed, self-support, and the effective use of one's mental abilities. The most significant findings of the research by Nezhada et al. (2010), which focused on analyzing the connections between resilience and hardiness and their links to mental health and athletic performance, show that both of these constructs positively predict changes in an athlete's mental health and performance. Kiliç (2020) sought to determine the relationship between psychological resilience and stress coping strategies in karate practitioners, finding that the perception of resilience was higher in men than in women and that there is a relationship between experience and the perception of resilience. Furthermore, the research also showed a positive relationship between resilience and stress coping styles. The results of research focused on analyzing the significance of differences in resilience in terms of contextual variables such as type of sport, gender, age, or level of sporting activity showed that the level of resilience is not conditioned by the type of sport or level of sporting activity. However, resilience in this study was conditioned by the age and gender of the respondents. Its overall level was higher in men and positively correlated with age, which is consistent with various studies and sports focuses (Cowden et al., 2016; Zurita-Ortega et al., 2017; Kivrak, Akandere, 2019; Kilic, 2020; Blanco-García et al., 2021; Patsiaouras, 2021). Resilience in athletes is not only formed by internal but also external sources. Among the most important of these are coaches and their relationships with athletes. The coach-athlete relationship is one of the fundamental pillars of building resilience in sport. Raanes et al. (2019) focused on analyzing the benefits of a functioning relationship between athletes and coaches, as well as the benefits of mental resilience and stress perception in relation to burnout syndrome. Their findings show an inversely proportional relationship between the likelihood of burnout and resilience, as well as the quality of the athlete-coach relationship. Sheikh (2015), in his analysis of differences in resilience levels between individual and team athletes and non-athletes, did not confirm their existence, which is, however, contrary to the research of other authors (Tugade, Fredrickson, 2004; Jalili, Hosseinchari, 2011, etc.), who have shown that athletes exhibit higher resilience than the non-athletic group and that the development of resilience is supported by participation in competitions. Sheikh's (2015) research partially corresponds with the research of Reche-García et al. (2020), according to which there is no difference in resilience between team and individual sports, but the authors found a significant difference in the degree of resilience in combat sports. In the case of emotional regulation, there are probably certain gender differences in the use of specific strategies. Balzarotti et al. (2016) found that women prefer strategies of constantly thinking about the negative emotions associated with the problem and thinking about the worst alternatives. Costa et al. (2020) came to similar conclusions, adding a focus on the reality of the situation, in which female athletes showed a higher preference, while male athletes preferred a planning strategy. In the case of the analysis of coping strategy preferences, male athletes primarily use active coping, planning, positive reappraisal, and acceptance strategies. Conversely, the least frequently used strategies were psychoactive substance use, behavioral disengagement, denial, and religiosity (Dias et al., 2010). Several studies confirm that athletes primarily use problem-focused and emotional coping strategies (Gould et al., 1993; Nichols et al., 2005; Nichols et al., 2006). This indicates a certain flexibility in the choice of coping strategy. According to Dias et al. (2010), athletes prefer problem-focused strategies in situations of high performance, while emotional regulation is preferred in situations of stressors beyond the athlete's control. The effectiveness of coping strategies therefore probably depends on the stressor and the circumstances affecting the athlete's performance. Since resilience is one of the key factors influencing athletic performance and given that a large number of similarly focused studies have been conducted outside of elite sports in

Slovakia, we decided to analyze the level of resilience, its factors, and cognitive-emotional coping strategies in Slovak elite athletes.

2. Materials and methods

We conducted basic research using a quantitative correlation-comparison design. The study population consisted of 208 Slovak elite athletes – 115 males (55 %) and 93 females (45 %) aged between 18 and 39 years (AM = 24.5y; SD = 4.18). The method of selection was stratified with the condition of their current active competitive sports activity at national or international level. One of the key inclusion criteria was a minimum of 5 years of sporting experience in addition to a demonstrable peak sporting level. These were athletes in team sports – hockey and football (N = 36; 17 %) and individual sports – judo, cycling, triathlon, biathlon, karate, golf, athletics and running (N = 172; 83 %). The average duration of their sport activity was 10.37r (SD=3.22). Data collection was carried out in cooperation with the Slovak Military Sports Centre Dukla Banská Bystrica. In line with known facts and in the context of our research design, we have formulated the following research hypotheses and one research question:

H1: We assume a significant gender difference in the level of resilience in favor of men.

H2: We assume a significant difference in the level of resilience in favor of athletes engaged in individual sports.

H3: We assume a significant gender difference in the total score of cognitive-emotional coping in favor of women.

RQ: Will cognitive regulation of emotions be a significant predictor of an athlete's overall resilience?

Data were collected using standardized CERQ questionnaires (Garnefski, Kraaij, 2007) and CD-RISC (Connor, Davidson, 2003).

Cognitive emotion regulation in sport has been measured by the Cognitive Emotion Regulation Questionnaire (Garnefski et al., 2001), which is designed to assess individual differences in cognitive emotion regulation in response to stressful or traumatic events in the event of sporting failures in competition. Respondents expressed their agreement with 36 statements using a 5-point Likert scale (1 = strongly disagree – 5= strongly agree). The questionnaire consists of the following strategies- Self-blame; Acceptance; Perseveration of Negative Emotions; Positive Orientation to the Situation; Planning; Positive Restructuring; Confrontation with a Similar Situation; Catastrophizing and Projection. Scores for each strategy ranged from 4-20, the higher the score the higher the preference for that strategy. The internal consistency of each strategy was sufficient (α=.77; -α=.93).

Resilience was measured by the Connor-Davidson Resilience scale – CD-RISC (Connor, Davidson, 2003), which is aimed at the general adult population. The scale focuses on resilience as the ability to cope with stress in the adult population. The questionnaire contains 25 items with responses on a 5-point Likert scale (0 = not at all valid – 4 = absolutely valid). The higher the score the respondent indicates the higher the level of resilience he/she achieves. Individual items are saturated by operationally defined factors such as: Hardiness (ability to control one's own life); Coping (ability to cope with stress); Flexibility (positive acceptance – adaptation to change); Meaning (ability to see meaning in life); Optimism (optimistic outlook on life); Cognitive-emotional regulation (ability to consciously use specific coping strategies to cope with emotionally challenging situations); and Self-efficacy (beliefs about one's own effectiveness in coping with challenging situations). The internal consistency of each factor was sufficient (α = .73; -α = .91)

We used univariate and bivariate descriptive statistics to process the research data, followed by inferential statistical procedures. We tested the normality of the distribution of the variables with the Shapiro-Wilkov test and the Kolmogorov-Smirnov normality test in the Lilliefors modification. Since some of the variables studied did not show normal distributions, we proceeded to use nonparametric statistical methods in all analyses. We used Spearman's rank correlation coefficient (rs) to analyze correlations. We used the Mann-Whitney U test to identify the significance of differences. The basic description of the variables is complemented by the verification of the internal consistency of each research instrument, and for each of them we verified the reliability using Cronbach's α coefficient. To verify the predictive influence of cognitive emotion regulation on the resilience of elite athletes, we used regression analysis (multiple linear regression method), where the dependent variable was resilience and the independent variable was cognitive emotion regulation.

We used Spearman's rank correlation coefficient (rs) to analyze the correlations
To assess the strength of the correlation coefficient, we used Cohen's (1988) distribution:
rS < .1 trivial correlation
rS < .3 weak correlation
rS < .5 moderately strong correlation
rS > .5 strong correlation

To identify the significance of differences, we used the Mann-Whitney U test, where in addition to statistical significance, we also determined the substantive significance using Cohen's coefficient of substantive significance *d*. In interpreting the value of substantive significance, we relied on the intervals reported by Cohen (1988):

d > .8 high substantive significance
d < .5 medium substantive significance
d < .2 weak substantive significance

3. Results

3.1. Resilience of elite athletes. First, we were interested in the current level of resilience of Slovak elite athletes in terms of gender and type of sport activity (Tables 1-3). From Table 1, it is clear that Slovak elite athletes achieved an average resilience score of AM=70.42. The minimum score was 40 and the maximum score was also the maximum level of CD-RISC gross score – 100.

Table 1. Descriptions of summary resilience scores in terms of observed contextual variables

	Median	Average	SD	Min	Max
Resilience	72	70.42	10.43	40	100
Men	73	72.31	10.8	49	100
Women	70	70.12	11.22	38	96
Football	65	66.84	9.31	40	98
Hockey	78	79.32	7.25	68	81
Cycling	80	80.43	12.82	70	99
Golf	59	59.82	7.41	53	66
Running	73	73.51	9.33	52	98
Biathlon	72	71.88	11.52	47	93
Triathlon	70	70.16	6.35	66	73
Athletics	68	69.12	8.25	57	88
Karate	62	63.54	9.48	42	77
Judo	81	82.32	14.33	54	98

Legend: SD – standard deviation, Min – minimum, Max – maximum

We were then interested in gender differences in Resilience (Table 2), where we found a significant difference in the overall Resilience score (p = .041), as well as in the Hardiness (p = .043) and Self-efficacy (p = .044) factors, always in favor of men. In both cases, differences were found in the weak substantive significance band.

Table 2. Significance of gender differences in individual factors of resilience in elite athletes

	Mann-Whitney U Value	p	Median		d
			Women	Men	
Resilience	2351.00	.041	14	18	.35
Hardiness	2027.00	.043	17	19	.22
Coping	2249.50	.462	13	13	-.17
Flexibility	2101.50	.721	14	15	-.03
Making Sense	2312.00	.621	14	13	.16
Optimism	2406.50	.322	16	16	.10
Cognitive-emotional regulation	2389.50	.481	16	16	.08
Self-efficacy	2284.50	.044	14	16	.21

Legend: p – statistical significance; d – value of substantive significance

Table 3 presents our findings of differences in Resilience and its individual factors according to the individuality of sport activity. We found a significant difference only in the overall level of Resilience in favor of individual athletes (p = .023; Mdn = 78).

Table 3. Significance of differences in individual factors of resilience in elite athletes in terms of individuality of sport focus

	Mann-Whitney U Value	p	Median		d
			Indiv. Sports	Group Sports	
Resilience	2351.00	.023	78	71	-.34
Hardiness	2287.00	.112	14	15	.12
Coping	2448.50	.412	15	15	-.18
Flexibility	2218.50	.461	16	13	.13
Making Sense	2484.00	.732	15	15	-.10
Optimism	2509.50	.567	15	17	.19
Cognitive-emotional regulation	2378.50	.323	16	15	-.18
Self-efficacy	2249.50	.801	15	14	-.07

Legend: p – statistical significance; d – value of substantive significance

In the case of the analysis of the association between Resilience and length of sport activity, we found a moderate positive association (rs = .389; p = .032).

3.2. Cognitive emotion regulation in elite athletes. Similarly to resilience, we analyzed the cognitive regulation of emotions of Slovak elite athletes in terms of gender and type of sport activity (Tables 4–6). In terms of individual sports, we found the highest scores in Cognitive regulation of emotion in athletes (AM = 131.53; Mdn = 133) and the lowest in karate athletes (AM = 112.86; Mdn = 113).

Table 4. Descriptions of cognitive emotion regulation summary scores in terms of observed contextual variables

	Median	Average	SD	Min	Max
Cog. emotion	122	123.52	9.54	90	150
Men	122	122.81	1.11	89	152
Women	120	119.23	8.35	99	144
Football	1148	118.32	5.31	106	125
Hockey	122	121.82	3.41	118	125
Cycling	125	126.32	9.48	116	143
Golf	120	121.32	6.65	115	120
Running	123	121.62	10.52	101	151
Biathlon	121	119.38	10.63	97	149
Triathlon	117	115.74	11.24	109	128
Athletics	133	131.53	8.35	120	147
Karate	113	112.86	9.18	95	118
Judo	120	118.93	12.62	108	144

Legend: SD – standard deviation, Min – minimum, Max – maximum

Testing the significance of gender differences in Cognitive emotion regulation strategies revealed that female athletes reported significantly higher levels of preference for Self-blame (p = .018; Mdn = 15) and Acceptance (p = .044; Mdn = 15), in both cases the differences were moderately substantive significant (Table 5).

Testing the significance of differences in terms of individuality of sporting activity in the Cognitive emotion regulation strategies is presented in Table 6.

Table 5. Significance of gender differences in individual cognitive emotion regulation strategies in elite athletes

	Mann-Whitney U Value	p	Median		d
			Women	Men	
Cognitive regulation of emotions	1609,00	.382	120	122	-.22
Self-blame	1937,50	.018	15	12	-.54
Acceptance	2030,00	.044	15	14	-.42
Perseveration of negative emotions	1944,00	.257	16	8	-.16
Posit. situation orientation	2194,50	.158	14	15	.17
Planning	2181,00	.741	14	12	.05
Positive restructuring	1967,00	.249	1	16	-.13
Confrontation	2196,50	.227	14	14	.21
Catastrophizing	2247.50	.352	11	12	.14
Projection	2158.00	.248	8	9	.14

Legend: p – statistical significance; d – value of substantive significance

Table 6. Significance of differences in individual cognitive emotion regulation strategies in elite athletes in terms of individuality of sport focus

	Mann-Whitney U Value	p	Median		d
			Indiv. Sports	Group Sports	
Cognitive regulation of emotions	1725.00	.039	119	120	-.45
Self-blame	2015.50	.051	16	14	-.08
Acceptance	2124.00	.214	15	14	-.12
Perseveration of negative emotions	1998.00	.332	15	8	-.14
Posit. situation orientation	2015.50	.541	11	13	.04
Planning	2171.00	.235	16	14	.05
Positive restructuring	1925.00	.041	16	12	-.44
Confrontation	2192.50	.187	15	14	.08
Catastrophizing	2105.00	.487	13	10	.11
Projection	1954.50	.225	9	9	.28

Legend: p – statistical significance; d – value of substantive significance

Our findings show that for the overall measure of Cognitive emotion regulation, group athletes scored significantly higher (p = .039; Mdn = 120), whereas for the preference for Positive restructuring, individual athletes scored significantly higher (p = .041; Mdn = 16). The substantive significance of both of these differences was in the medium substantive significance range.

3.3. Cognitive emotion regulation as a predictor of resilience in elite athletes. We concluded our study by investigating the predictive influence of Cognitive emotion regulation on Resilience in elite athletes (Table 7).

Table 7. Multiple linear regression

	B	β	t	p
Constant			4.328	.000
Cognitive reg. of emotions	.496	.383	7.003	.000
F (9.48) = 52.602***	R^2 =.385		Adj. R^2 = .323	

Legend: B – unstandardized regression coefficient, β – standardized regression coefficient, t – t-test, p – statistical significance, F – F-test; ***p < .001

After checking the assumptions (normality of the distribution of residuals, testing for multicollinearity, homoskedasticity, removing outliers, etc.), we opted for the multiple linear regression method.

Analysis of variance shows that the regression result is statistically significant. From the data presented in Table 7, it is clear that the proposed regression model explains 32.3 % of the dependent variable – resilience. Thus, cognitive emotion regulation is a positive predictor of the overall level of resilience of elite athletes.

4. Discussion

The issue of resilience has received considerable attention worldwide. Several studies have reported findings on its current average level in the general population (Connor, Davidson, 2003; Davidson, Coonor-Davidson, 2021; Johnson, 2021, etc.). However, we can also find studies focused on resilience in sports, stating its average level among long-distance runners (Gonzales et al., 2016), cricket players (Gucciardi, 2011), and athletes (Hosseinni, Besharat, 2010). Our research sample was significantly heterogeneous in terms of sports activities, which was also reflected in the different average levels of mental resilience among athletes. The highest level of resilience was reported by judo and cycling representatives, while the lowest level was found among golfers. Based on the average values, we can conclude that top athletes in Slovakia report a total resilience score in the lower range of the general average. However, we have not come across any studies pointing to the effectiveness of programs developing resilience in Slovak athletes, which supports our findings of a lower average level compared to foreign studies.

In terms of gender differences, we expected a higher level of resilience in male athletes in H1. We were able to confirm this assumption, as we found a significant difference not only in the overall level of resilience but also in the factors of hardiness and self-efficacy using the Mann-Whitney test. Despite the heterogeneity of the research sample, our findings clearly correspond with foreign studies (Cowden et al., 2016; Zurita-Ortega et al., 2017; Kivrak, Akandere, 2019; Kilic, 2020; Blanco-García et al., 2021; Patsiaouras, 2021), not only in terms of gender differences, but also in terms of the relationship between resilience and the length of time spent participating in sports activities, where we found a moderately strong positive correlation. In this case, the directly proportional relationship between the level of resilience and the increase in the number of competitions completed is one of the most important factors increasing the level of mental resilience in athletes (Kilic, 2020).

In the second research hypothesis, we assumed a significant difference in the level of resilience among athletes in relation to the individuality of sports performance in favor of athletes engaged in individual sports. We were able to confirm this assumption at a 5 % level of statistical significance, which corresponds with some foreign studies (Tugade, Fredrickson, 2004; Jalili, Hosseinchari, 2011), leading us to conclude that the mechanisms for creating and developing resilience in individual and team athletes are different. According to Fletcher and Sarkar (2016), the development of resilience in individual sports emphasizes primarily the subjective and individual needs of the athlete in the areas of cognitive processes, executive functions, goal-directed attention, and emotion regulation, while in team sports, the emphasis is on team resilience and the interpersonal factor of resilience. Our findings are also at odds with the study by Sheikh (2015) and, to some extent, Reche-García et al. (2020). The study by Reche-García et al. (2020) is particularly inspiring for us, as although the authors did not find a difference in resilience between team and individual sports, they did find a significant difference in the level of resilience in combat sports. Our research shows a similar trend, as judo representatives achieved the highest average level of resilience, while karate practitioners achieved the lowest level. Given the size of both groups, we consider this finding to be inspiring for future empirical analyses.

Similar to resilience, we also analyzed the cognitive regulation of emotions in Slovak top athletes in terms of gender and type of sporting activity. From the perspective of individual sports, we found the highest scores in cognitive regulation of emotions in athletes and the lowest in karate practitioners. Since several studies (Gould et al., 1993, Nichols et al., 2005; Nichols et al., 2006) point to a certain flexibility in the choice of coping strategies among athletes, we were interested in what strategies male and female athletes would prefer and whether the difference between them would be significant (H3). In the case of the overall score, we were unable to confirm the difference as significant, but our findings show that female athletes reported a significantly higher preference for the Self-blame and Acceptance strategies. Our findings partially correspond with the findings of

(Balzarotti et al., 2016; Costa et al., 2020) and suggest that female athletes are more likely to show signs of internality and attribute the results of their athletic performance to their own efforts, which leads to reconciliation – acceptance of the situation.

In terms of differences in the individuality of sporting activities, team athletes achieved significantly higher scores in cognitive emotion regulation, while individual athletes preferred the Positive Restructuring strategy. In other words, team athletes report a higher degree of cognitive-emotional coping ability, while individual athletes have a more developed ability to see the results of their performance from different perspectives. An analysis of available sources shows that there are differences between individual and team athletes in their perception of stressors and their responses to them. Team athletes perceive stressors as a problem for the whole team, use the synergistic effect of joint solutions, and often choose group coping strategies (Crocker et al., 2015). Stressors in team sports often stem from social pressure (provocations from opponents, behavior of spectators, coaches, etc.), relationships within the team (interpersonal conflicts), poor performance (opponent dominance, inability to score, etc.), or material and organizational conditions (Leprince et al., 2018). Individual athletes, however, perceive and are sensitive to the fact that they are practically alone in coping with stressors. According to Dias et al. (2010), these athletes report higher levels of fear, somatic anxiety, and threat perception and prefer strategies of expressing emotions, which corresponds to the preference for self-blame among individual athletes, the difference which proved to be just above the threshold of statistical significance.

In an effort to gain a more comprehensive view of the determination of resilience from the perspective of cognitive emotion regulation strategies, we were interested in whether cognitive emotion regulation would act as a significant predictor of overall resilience. We found that the proposed regression model explains more than 32 % of the variability of the dependent variable – resilience. This shows that cognitive-emotional coping is a positive predictor of resilience in Slovak athletes, and we therefore consider it beneficial to focus on developing its individual strategies through a development program designed specifically for the needs of individual sports.

The most significant limitation of our research was the heterogeneity of the research sample and the significantly uneven distribution of the sample in terms of individual sports. A certain limitation in the generalization of our findings also results from the specifics of self-reporting tools for collecting research data. Our intention for the future is definitely to increase the size of the research sample and analyze the preferences of individual cognitive emotion regulation strategies from the perspective of individual sports. From the perspective of techniques that have been researched and verified abroad, the Method of Conscious Attention Control (Model of Circles of Attention – Eberspächer, 1990) appears to be effective. The importance of attention is also emphasized by Gregor (2013) and Pavel and Pavlová (2019). The potential for conscious concentration on a goal can be found in the concept of mindfulness, which has its roots in Buddhist philosophy and according to which regular, short exercises influence the increase in resilience and cognitive regulation of emotions, with the subsequent experience of flow (Jackson, Csikszentmihalyi, 1999; Kabat-Zinn, 2003; Zeidan et al., 2010; Gardner, Moore, 2012; Sant, 2015). Therefore, another of our goals is to design an intervention program for the development of individual factors of resilience and the training of effective emotion regulation strategies in Slovak athletes and to experimentally verify its effectiveness.

5. Conclusion

Every sport is specific and unique in some way, but it always places high demands on the athlete's self-regulatory and adaptive mechanisms. Coping with mental stress in the environment of top-level sport is largely dependent on the level of resilience and the ability to effectively use coping strategies. It is especially true that top athletes face higher performance demands compounded by higher expectations, and these individuals are able to adequately regulate and manage this pressure thanks to training and previous repetitive experiences. Many athletes are aware of this fact and work specifically on their mental resilience.

Numerous studies confirm that athletes with an adequate level of resilience are characterized by greater self-confidence, higher concentration, and the ability to better control the situation during races and competitions, as well as higher performance motivation. They achieve more stable peak performances, better control their thoughts and individual steps during performance, and are better at planning short-term and long-term goals. They believe in themselves more and do not allow themselves to be influenced by negative external factors. They know how to use competitive

pressure to their advantage, cope better with anxiety, fears, and are able to deal with disruptive changes in their environment more easily.

Our research aimed to contribute to raising awareness of mental toughness among top athletes in Slovakia, which can be specifically improved through mental training, which is often not given adequate attention alongside the physical component (Kováčová, Broďáni, 2008; Chochlíková, 2018, etc.). We therefore consider our research findings to be an exploration of the issue under investigation, with the potential to inspire further studies, whether comparing athletic and non-athletic population, revealing further specifics of stress management in athletes, or verifying the effectiveness of intervention programs that develop resilience – its individual factors, but also emotional regulation, which appears to be an important determinant not only of athletic performance, but also of the athlete's quality of life. The results of our study also provide a basis for the implementation of either longitudinal monitoring of the development of resilience, or experimental verification of the effectiveness of psychological interventions focused on self-regulation techniques, whereby we consider the Method of Conscious Attention Control or mindfulness approaches, which can positively influence the level of resilience and cognitive regulation of emotions in athletes, to be promising.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 128-138
DOI: 10.13187/ejced.2026.1.128
https://ejce.cherkasgu.press

Using Online Quests in Blended Learning for the Development of Student Competencies in Professional Education

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Abstract

Although digital tools are increasingly integrated into professional education, their structured impact on the development of student competencies requires further empirical validation. Web quests offer a guided inquiry format in which students work with selected online resources to solve professionally oriented tasks. By organizing the search and processing of information, this approach supports the integration of theoretical knowledge with practical application. The aim of this study was to examine the effectiveness of web-quest technology in professional education, with a particular focus on its influence on the development of key student competencies. The experimental group (n = 40) completed learning tasks using the web-quest format, whereas the control group (n = 42) followed traditional instructional methods. Data was collected through structured classroom observations and a teachers' survey. The results were then analyzed statistically to determine whether there were any performance differences between the two groups. The study clarifies the fundamental concept of "web quest" and presents the results of an empirical study evaluating the usefulness of this method in professional education, utilizing survey methods and pedagogical observation. The results showed that using webquests during learning improves student performance. This includes not only student competencies but also problem-solving skills, teamwork, and also increases motivation and developing time management skills. The authors predict that webquests can be an effective technology for stimulating student engagement and improving educational outcomes.

Keywords: inquiry-based learning, instructional design, student engagement, collaborative learning, competency-based education.

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1. Introduction

The importance of a resource-oriented approach to higher education has become increasingly evident in recent years, particularly in the context of lifelong learning, which is now recognized as a fundamental requirement of contemporary professional development (Poroshenko et al., 2024; Shichkin et al., 2024). The web quest technology is a crucial tool for implementing resource-oriented learning (Afanasyev et al., 2017; Kudashkina et al., 2022). It enables the creation of a holistic didactic model based on online information searches and provides an individualized educational trajectory for each student (Larionova, 2020).

In addition, web quests can increase students' interest in learning by assigning clearly defined tasks and expected outcomes. They contribute to the development of teamwork, creative problem-solving, independent decision-making, and critical thinking, while also encouraging initiative and responsibility. The web quest method was developed in the mid-1990s by T. March and B. Dodge from the University of California, San Diego (Maddux, Cummings, 2007). The founders of this technology define it as an inquiry-based, reference-oriented activity, in which students conduct information searches using internet resources and video conferencing (Dodge, 1995). This method is often associated with project-based learning since it encourages students to work on a problem posed by the teacher, ultimately leading to an original student-developed solution (Vavulina, Nikolaenko, 2017). Web quests are most commonly used as group assignments, though they can also be adapted for independent work (Stetter, Hughes, 2017). Additionally, they are well-suited for distance learning (Babina, Utusikov, 2024).

Research literature conceptualizes web quests as structured interactive learning activities that require students to independently acquire and analyze information from online resources (Khlupina, 2016). Some authors emphasize their problem-based nature and the inclusion of role-playing components (Bezrodnykh, 2016), while others describe them as mini-project formats centered on guided internet research (Pryadilynikova, 2015). This constructive learning approach helps students select and organize online information, while directing their efforts toward tasks related to their future profession.

The primary purpose of web quests, as noted in the literature, is to engage students in independent search and processing of information (Yefanova, Lavrishchev, 2022). Researchers emphasize their potential to strengthen motivation and contribute to the development of key competencies, including research skills, creativity, and the ability to present results effectively (Skylar et al., 2007; Kicherova, Efimova, 2016). Web quests are also described as a form of internet-based project work that enables purposeful use of online resources (Klimova, 2016). Although this format is often implemented in small groups, it can also be adapted for individual learning tasks (Petrova, 2014).

The primary reason for web quests integration into education is their positive effect on the ability of students to structure student activities and acquire key competencies (Petukhova, 2011). Students using this method develop solutions based on pre-selected sources while also independently filtering and evaluating information. This process enhances their cognitive abilities and logical thinking (Gazizova et al., 2025).

K. Subramaniam (2012) identified the most critical competencies that web quests help to develop, such as critical thinking, opinion formulation, and the creation and application of knowledge. According to researchers, web quests offer a range of educational benefits: they support personal development by increasing motivation to learn, encouraging self-improvement and self-realization, and fostering self-awareness through exploring creative potential and overcoming internal barriers (Miller, 2015); they build cross-disciplinary skills by developing cognitive functions, enhancing communication, strengthening information-processing abilities, and improving self-organization, problem-solving, and adaptation to social roles (Goltsova, Protsenko, 2020); and they contribute to subject-specific learning by promoting the acquisition of new knowledge and its practical application (Goltsova, Protsenko, 2021). Based on these considerations, this article aims to analyze the use of the web quest method in professional education.

2. Research methodology

To achieve the aim of the study, authors conducted quantitative and qualitative study. The main methods included a pedagogical experiment and a survey.

The fundamental concept of the study: web quest, which was discovered with the literature review of psychological, pedagogical and scientific-methodological sources.

The testing of the developed web quests and the accompanying research led to the achievement of two key strategic goals. The first was focused on gathering feedback to facilitate improvements, including appropriate modifications to the developed materials, according to the project assumptions.

The primary objective of the empirical study was to assess the effectiveness of web quests in professional education, and the additional objectives were:

– Investigate whether and to what extent the web quest method supports the development of students' cognitive and social competencies.

– Gather students' and teachers' opinions on working with web quests.

– Diagnose the limitations and challenges students face when working with the web quest method.

The research sample consisted of 82 students total, 40 students in experimental group (EG), participating in the web quest and 42 students in the control group (CG) receiving traditional instruction during practical lessons. EG and CG were formed based on existing academic groups enrolled in the same professional education program, to ensure comparability in terms of educational background and workload.

The study also included 16 teachers who delivered both web quests and traditional lessons in their subject areas. Each teacher had more than five years of relevant teaching experience. Although they were not participants in the experiment, they acted as collaborators by supporting data collection. To ensure consistency, the teachers attended briefing sessions on how to implement the web quest approach and apply the observation criteria. They were instructed in advance on conducting web quests and completing observation sheets so that the method and the recording of results were standardized.

Observation was the main research method. Teachers completed an observation sheet for every student – both those in the experimental group (EG) who took part in the web quest and those in the control group (CG) who did not – evaluating student behavior while working on a particular topic. Each category was rated quantitatively on a 1–5 scale.

The observation data were then analyzed using mathematical statistical techniques to determine whether the distributions of students' average category scores differed between the two groups. For this purpose, the Pearson's chi-squared (χ^2) test was used. The measurement scale used consisted of two categories ("above 5 points" and "below 5 points"), meaning the degrees of freedom (v) = 1. From the χ^2 table, for a significance level of $\alpha = 0.05$ and 1 degree of freedom, the critical value was determined as $\chi^2\_crit = 3.841$.

Statistical hypotheses of the study

– H_0: The empirical distributions of students' average performance scores in the EG and CG across different categories do not differ after the implementation of the web quest.

– H_1: The empirical distributions of students' average performance scores in the EG and CG across different categories differ after the implementation of the web quest.

As a supplementary research method, a survey was conducted among students and the 16 teachers who supervised the implementation of the web quests after their completion. Responses were assessed using a Likert scale (Definitely yes; Probably yes; Neutral; Probably no; Definitely no).

3. Results

An important aspect of the study was the observation of students during their work with the web quest method. Teachers evaluated student performance across several dimensions, including understanding of the topic, level of activity, teamwork, use of information search strategies, and work pace, measured by the time required to complete tasks. As part of the study, teachers filled out 82 observation sheets for students working with the web quest method (EG) and those following traditional teaching methods (CG). To achieve the study's objectives more fully, arithmetic averages were calculated for specific categories assessed by teachers on a scale from 1 to 5 (the list of average scores is presented in Table 1).

The calculation of the χ^2 criterion for CG and EG showed that $\chi^2 > \chi^2$ critical for most of the observation indicators, showing differences between experimental and control groups. These results allow the null hypothesis to be rejected in favor of the alternative hypothesis. Overall, the findings support the initial assumption that the web-quest intervention influenced the measured parameters.

Table 1. Arithmetic mean scores for students' performance in specific areas based on observations (N = 82), and results of statistical analysis

Research Area	Observation Object	Average Score		χ2
		EG (40)	CG (42)	
Student Activity	Student Independence	3,97	3,22	6,45*
	Work Organization	4,14	3,32	12,21*
	Ability to Use Teacher's Help	3,95	3,78	1,15
	Student Creativity	4,05	3,19	10,43*
	Problem-Solving Skills	4,04	3,41	8,65*
	Task Management	3,92	3,23	4,39*
Team Communication	Information Sharing Opportunities	4,18	3,65	8,32*
	Quality (Effectiveness) of Communication	4,24	3,85	5,88*
Information Search	Ability to Use Internet Information	4,26	3,61	7,41*
	Use of Links Provided by the Teacher	4,49	4,29	2,33
Work Pace – Time Needed to Complete the Task	Work Pace	4,17	3,46	9,24*
	Use of Teacher's Help at the Right Moment	4,11	3,64	8,93*
	Ability to Use Help from Other Students	3,80	3,68	1,03
	Time Management	4,15	3,55	5,74*

Source: Own research.
Notes: * $p \leq 0.05$

The collected empirical material suggests the diversification of student competencies and skills. The easiest task for students working with the web quest method was information search. They easily used the links provided by the teacher, and their average score for this competency was the highest – 4.49. While completing their assigned tasks, they also freely utilized internet resources, effectively processing the information they gathered.

Teachers also gave positive evaluations of teamwork in the experimental group, noting that students effectively exchanged information and coordinated their efforts within teams. Other competencies of EG students were also rated highly (average score above 4.0), such as work organization (4.14) and timely use of teacher help (4.11); student creativity (4.05) and problem-solving skills (4.04). Competencies in time management and work pace were also rated highly.

The data collected during the subsequent student survey indicated that the majority of students liked the assignments they completed as part of testing the developed instructional tools (Table 2).

Table 2. Students' opinions on the assignments completed while testing the web quest method (N = 82)

Question	Responces		
	Yes	No	Can't answer
Did you like the assignments you completed while working on the web quest?	69	0	13

Source: Own research

When evaluating the topics of the lessons conducted using the web quest method, students were allowed but not required to express their opinions across several aspects. The largest group of 55 students stated that the topics of the developed web quests were interesting. Forty-two students described them as engaging, and 37 students found them understandable. Only a few students expressed views that contradicted these statements. A detailed distribution of student responses is presented in Table 3. Some students also commented on the level of difficulty of the topics discussed during testing. Eighteen of them considered the topics easy, while 24 students indicated they were difficult.

Table 3. Evaluation of lesson topics delivered using the web quest method (according to students, N = 82)

No.	Statement: "In your opinion, the topics of the web quests you worked on were..."	Number of responses
1	interesting	55
2	not very interesting	3
3	engaging	42
4	boring	2
5	understandable	37
6	not understandable	1
7	easy	18
8	difficult	24

Source: Own research

An additional source of information on the usefulness of the web quest method in professional education was the teacher survey.

Teachers also confirmed the students' opinions regarding their satisfaction with the tested method (see Table 2). Half of the surveyed teachers stated that the web quest method was definitely accepted by students and was more popular among them compared to traditional teaching methods, while the rest considered this highly likely. Respondents also noted that the web quest method increases student interest in the lesson topic (see Table 4).

Table 4. Evaluation of the acceptance of the web quest method and student satisfaction in lessons (as reported by surveyed teachers, N = 16)

No.	Statement: "The web quest method..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Is accepted by students	8	8	0	0	0
2	Is more popular among students than traditional teaching methods	8	8	0	0	0
3	Helps engage students with the lesson topic	6	6	4	0	0
4	Engages students more effectively than traditional methods	5	7	4	0	0
5	Enhances student satisfaction with lesson participation	10	6	0	0	0
6	Increases student satisfaction with lessons more than other teaching methods	6	5	4	0	0
7	Motivates students to work independently on homework	11	5	0	0	0
8	Encourages independent work on homework more than traditional methods	9	6	1	0	0

Source: Own research

However, when comparing web quests with more traditional teaching methods, only five teachers were fully convinced that web quests are more effective in generating interest in the discussed topic.

Nonetheless, the majority of respondents (10 teachers) were certain that the web quest method enhances student satisfaction with participation in lessons. When comparing this method with other approaches used in the learning process, teachers displayed slightly less enthusiasm – six teachers believed that web quests contributed to greater student satisfaction compared to other methods, five teachers found this statement likely, while four teachers saw no significant difference between the compared methods.

All surveyed teachers agreed that web quests encourage students to engage more actively in independent homework, with 11 respondents expressing strong confidence in this effect. Compared with traditional methods, the web-quest format was generally viewed as more effective in sustaining students' interest beyond classroom activities.

While evaluating its broader educational impact, most teachers reported that students were willing to work within the web-quest framework, although some noted that engagement depended on the specific topic. The method was also associated with a more favorable classroom atmosphere and higher motivation during lessons. Several teachers attributed this to the structured organization of tasks and more efficient use of instructional time (Table 5).

Table 5. The impact of the web quest method on lesson organization and student motivation (as reported by surveyed teachers, N = 16)

No.	Statement: "The web quest method..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Is associated with a friendly classroom atmosphere	10	5	1	0	0
2	Stimulates student motivation to participate in lessons and learn	9	7	0	0	0
3	Positively influences lesson organization	8	5	3	0	0
4	Improves time management during lessons	8	4	4	0	0

Source: Own research

The surveyed teachers also considered the role of web quests in assessing students' knowledge and skills. Most respondents (n = 12) indicated that the method supports more effective ongoing assessment during lessons. Several teachers additionally noted its usefulness in evaluating students' understanding after class, particularly through homework tasks.

At the same time, opinions were more reserved when web quests were compared directly with traditional instructional methods in terms of overall assessment effectiveness (Table 6).

Table 6. The usefulness of the web quest method in assessing students' knowledge and skills (as reported by surveyed teachers, N = 16)

No.	Statement: "The web quest method allows the teacher to..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Conduct ongoing assessment of students' knowledge and skills during lessons	4	8	2	2	0
2	Assess students' knowledge and skills after the lesson	5	6	3	2	0
3	Recognize students' knowledge and skills more effectively than traditional methods	2	5	6	3	0

Source: Own research

The surveyed teachers expressed their views on the web-quest method as a tool for developing students' key competencies and skills. In particular, they highlighted its role in fostering purposeful information search, information processing, and problem-solving. Teachers

also associated the method with the development of critical and creative thinking, teamwork, and higher-order cognitive skills such as analysis, synthesis, and evaluation of information. All respondents agreed that the web quest method definitely or probably contributes to the development of these competencies.

Another confirmation of the method's usefulness in developing students' key competencies is the opinion of most teachers, who stated that working with the web quest method focuses students' efforts on information processing. A detailed breakdown of the respondents' answers is presented in Table 7.

Table 7. Teachers' evaluation of the web quest method as a tool for developing key competencies and skills in students (N = 16)

No.	Question: "Do you think that the web quest method teaches students to..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Purposeful information search?	10	6	0	0	0
2	Information processing?	14	2	0	0	0
3	Problem-solving?	9	7	0	0	0
4	Critical and creative thinking?	7	9	0	0	0
5	Teamwork?	12	4	0	0	0
6	Support mental processes at the level of analysis, synthesis, and evaluation?	11	5	0	0	0

Source: Own research.

4. Discussion

The testing of web-quest tools and the conducted research confirmed the usefulness of the method in student learning. The study determined the extent to which the web-quest method contributes to the development of cognitive and social competencies among students. This finding aligns with the results of Abdullayev et al. (2024), who demonstrated that digital learning platforms significantly enhance student motivation and competence development in language acquisition. Previous studies have shown that targeted digital instructional methods can promote deeper engagement and more sustained skill development, which aligns with the patterns observed in the present study (Akhtarieva et al., 2025).

The results indicated that the web-quest method contributed to the development of several key competencies, including purposeful information search, information processing, problem-solving, and collaborative work. It also supported higher-order thinking skills such as analysis, synthesis, and evaluation. The empirical findings further suggested that web-quest activities helped students consolidate and structure learning material, thereby supporting the achievement of instructional objectives. Their use also appears to improve the classroom climate and encourages students to engage more actively. In addition, teachers reported that web quests contribute to better structuring of instruction and more efficient use of lesson time. These findings are consistent with the results reported by Bozhkova et al. (2025), who showed that smartphone-supported interactive activities can enhance students' cognitive engagement and organizational behavior. In this study, students who used digital tools demonstrated more effective time management and greater initiative.

In parallel, the study aimed to capture teachers' perspectives on web-quest-based instruction. Survey responses and observation sheets show a high level of agreement among teachers about the method's overall usefulness. They consistently highlighted benefits related to competency development, such as strengthening collaboration, encouraging creativity, stimulating intellectual curiosity, and increasing motivation to work through the assigned problem. This interpretation is consistent with earlier research (Kaivola et al., 2012; Klimova, 2016; Miller, 2015) reporting that web quests can enhance students' practical abilities. It also aligns with findings that students tend to respond positively to web quests when working with computers (Petrova, 2014; Subramaniam,

2012). Akhmetshin et al. (2024) presented a broader approach that reflects a competency-based approach to teachers' personal and professional development. Meanwhile, Pashkurov's (2022) article explores structured digital strategies for developing students' soft skills. These findings support the use of webquests in developing professional qualities and competencies.

However, there are a number of difficulties that students may face in the course of webquests. Teachers most frequently mentioned challenges with team communication, low self-confidence among some learners, and differences in working speed across students. Based on the teachers' feedback, the effectiveness of web quests also depends on students' cognitive readiness and ability to process information. Related work supports this view: Pivneva et al. (2023) observed that blended-learning environments such as MyEnglishLab can raise motivation and engagement, and that students who are active in digital settings are more likely to take responsibility and contribute productively to group tasks – an argument that supports the value of role-based collaboration embedded in web-quest formats. In addition, Gazizova et al. (2025) emphasized that digital tools are most effective when implemented in line with Education 4.0 principles, including flexibility, personalization, and active learner participation.

Teachers' open-ended responses further illustrate these points. For example, Andrey V. described web quests as a method that pushes students to analyze and synthesize online information, noting that learners gain satisfaction from resolving scenario-based problems independently or in groups and that the approach can prepare them for future remote work. During the survey, teachers noted that participation in web-quest activities increased student confidence, stronger social skills, and developed more coordinated teamwork. Sergey K. likewise emphasized that the method promotes independence by requiring learners to interpret texts, identify key ideas, and extract what matters most. Several additional teachers linked web quests to outcomes they believed would help students better remember and reinforce what they learned throughout the educational process. for example, practical application of information, arguing that group-based tasks improve cooperation, support weaker students, encourage constructive communication. Also, during such activities students can exchange, and promote independent problem-solving skills. Vladimir G., for instance, stressed that group work can cultivate creativity and strengthen students' sense of responsibility for assigned roles.

Despite the predominantly positive evaluations, teachers also pointed to clear constraints. Valentin T. argued that web-quest materials must be adapted to students' cognitive level to remain accessible and meaningful. Anatoly R. highlighted barriers such as difficulties coordinating teamwork and the occasional lack of access to certain online resources. Dmitry N. added that low motivation can undermine success, emphasizing that outcomes depend heavily on students' willingness to cooperate and invest effort in the task. A well-structured web-quest with good student motivation and clear goals guarantees success in solving the task. The teacher-coordinator plays an important role here, as they can explain anything unclear at any moment and boost motivation, preventing interruptions in the work." In addition to the limitations already mentioned, teachers also pointed to the following challenges when working with students:

– "Difficulties using the computer";

– "Problems with group integration";

– "Problems with student independence";

– "Difficulties translating theoretical knowledge into practical solutions for various problems."

A limitation of the study is the size of the sample of teachers who participated in the survey.

Future research may focus on analyzing students' perceptions of the usefulness of the web-quest method.

5. Conclusion

In our opinion, the empirical data positively confirms the research hypothesis, which suggests that the web-quest method contributes to the development of students' competencies and is beneficial in professional education. The conducted study also highlights the most significant advantages and drawbacks of using the web-quest method in working with students. The main advantages of the diagnosed method in student work are:

– Positive perception by the majority of both teachers and students;

– Structured and targeted stimulation of students' activity and academic curiosity aimed at achieving the intended learning goals;

– Beneficial impact on the development of key competencies and skills of students;

– Universality of understanding due to the ability to use the web-quest method when introducing new content or reviewing previously learned material;

– Positive effect on student motivation, classroom atmosphere, and the organization and proper use of time during lessons;

– Possibility of application for various topics;

– Reliance on internet resources, which are a medium favored by young people;

– High accessibility of mobile devices and computers, as well as the availability of computer equipment in classrooms.

Weaknesses and limitations of using the web-quest method in working with students include:

– Difficulties some students face in communication and teamwork;

– Necessary to ensure flexible and individualized use of the web quest by the teacher, including the correct development, preparation, and explanation of available Internet resources to the students of the course, as well as to provide flexibility in the time and volume of work performed for both individual students and working groups;

– The necessity of constant monitoring of students' work and providing them with motivational support;

– The need to translate and explain the concepts and issues students encounter on the internet.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 139-153
DOI: 10.13187/ejced.2026.1.139
https://ejce.cherkasgu.press

Development of Self-Regulated Learning Skills in University Students Through Intelligent AI Agents

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Abstract

Self-regulated learning capabilities determine academic success in higher education, yet traditional instruction shows limited effectiveness in developing these essential competencies. This quasi-experimental study investigated how intelligent AI agents influence SRL development in 384 university students across three Polish institutions during the 2022–2023 academic year. We assigned 196 students to an intervention group using an integrated AI system with adaptive pathways, metacognitive scaffolding, analytics dashboards, and automated feedback, while 188 controls received conventional instruction. Both groups completed the Motivated Strategies for Learning Questionnaire before and after the 16-week intervention, with behavioral data continuously logged throughout. Results showed the intervention group achieved 34.7 % higher metacognitive awareness (Cohen's $d = 1.23$, $p < 0.001$), demonstrating students became substantially better at reflecting on and directing their learning processes. Self-monitoring behaviors improved by 41.2 % ($d = 1.38$, $p < 0.001$), meaning students tracked their progress and adjusted strategies more effectively. Goal-setting effectiveness rose 28.9 % ($d = 0.97$, $p < 0.001$), indicating clearer learning objectives and better planning. Learning analytics revealed intervention students visited the platform 2.3 times more frequently and accessed 2.3-fold more diverse resources than controls. Multiple regression showed that AI-mediated metacognitive support predicted nearly half the variance in academic achievement ($R^2 = 0.473$, $F(4,379) = 85.42$, $p < 0.001$). However, cluster analysis identified concerning dependency patterns in 23.6 % of intervention participants who over-relied on AI guidance despite receiving the same intervention as more autonomous peers. These findings demonstrate intelligent agents can powerfully enhance self-regulatory capacities while highlighting the need for designs that prevent maladaptive dependency and maintain student agency.

Keywords: self-regulated learning, intelligent agents, metacognitive strategies, adaptive learning systems, learning analytics, higher education, artificial intelligence.

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1. Introduction

University students today face a crucial challenge: developing the ability to direct their own learning without constant instructor guidance. Recent evidence shows many students lack essential self-regulatory skills, struggling with goal-setting, progress monitoring, and strategic adaptation (Kong, Lin, 2023). This deficiency becomes particularly problematic during the transition from highly structured secondary education to autonomous tertiary learning, contributing to first-year attrition rates exceeding 30 % in developed nations (Xu et al., 2023). Self-regulated learning encompasses the cognitive, metacognitive, and motivational processes through which learners actively control their educational trajectories (Zimmerman, 2002). Students who effectively self-regulate set clear learning goals, select appropriate strategies, monitor their understanding, and adjust their approaches based on performance feedback. Traditional interventions aimed at building these skills yield modest results, with meta-analyses showing average effect sizes around d = 0.42 (Dignath, Büttner, 2008). These limitations stem from several factors: generic rather than personalized guidance, delayed feedback that arrives too late to inform ongoing learning, and inability to provide individualized support at scale across hundreds or thousands of students. The emergence of artificial intelligence technologies opens new possibilities for addressing these constraints. AI-powered systems can analyze learning data in real-time, adapt to individual student characteristics, and deliver personalized scaffolding at unprecedented scale (Jin et al., 2023). These systems leverage machine learning algorithms to process behavioral traces, performance patterns, and engagement metrics, enabling dynamic adjustment of instructional strategies based on each learner's needs (Xu, Ouyang, 2022). Intelligent agents represent autonomous software systems that perceive their environment, make goal-directed decisions, and adapt their behavior without constant human intervention. In education, these agents function as pedagogical partners, providing personalized recommendations, metacognitive prompts, and adaptive feedback calibrated to learner proficiency and strategic preferences (Kuhail et al., 2023). Recent empirical work documents substantial performance gains from AI-mediated instruction, with effect sizes ranging from d = 0.68 to d = 1.15 across various academic subjects (Lin et al., 2023). Yet critical questions remain unanswered about precisely how intelligent agents enhance self-regulatory processes, how to design systems that balance automation with learner agency, and what risks emerge from potential cognitive offloading when students become overly dependent on AI guidance.

Theoretical frameworks for understanding SRL emphasize three cyclical phases. The forethought phase involves goal specification, strategic planning, and self-efficacy calibration before learning begins. The performance phase includes attention focusing, self-instruction, and progress monitoring during learning activities. The self-reflection phase encompasses self-evaluation, causal attribution, and adaptive responses after completing learning tasks (Panadero, Alonso-Tapia, 2014). Metacognitive regulation serves as the central coordinating mechanism across all phases. Intelligent agents offer unique capabilities for supporting each phase through automated tracking of learning behaviors, pattern recognition in large datasets, and personalized recommendations based on individual learning histories. However, empirical evidence remains fragmented regarding how AI affects different SRL dimensions and which individual characteristics moderate intervention effectiveness (Fan et al., 2023).

Existing research shows promise but leaves important gaps. Studies demonstrate that learning analytics dashboards enhance metacognitive awareness by visualizing engagement patterns and performance trajectories, with students reporting 42 % improvement in self-monitoring accuracy when they can see graphical representations of their learning behaviors (Zheng et al., 2022). Adaptive feedback systems using natural language processing prove more effective than generic responses, yielding 28 % higher task completion rates and 35 % faster help-seeking when feedback addresses specific learner needs (Nazaretsky et al., 2022). However, most investigations examine isolated AI features rather than integrated systems combining multiple support mechanisms. Additionally, methodological limitations including small samples, brief interventions, and over-reliance on self-report measures constrain generalizability.

Three critical gaps characterize current knowledge. First, we lack understanding of how to optimally integrate AI-mediated metacognitive prompts with adaptive content delivery – specifically regarding when to intervene, how frequently to prompt, and how specific prompts should be. Second, limited empirical evidence addresses potential negative consequences when students become overly dependent on AI, including metacognitive laziness and diminished self-efficacy if automated guidance replaces rather than supports self-regulatory effort. Third, research

inadequately examines which individual differences moderate AI effectiveness, such as prior self-regulatory competence, domain knowledge, and digital literacy. These knowledge gaps impede development of evidence-based design principles for intelligent agent systems.

The present investigation addresses these gaps through comprehensive quasi-experimental research examining integrated intelligent agent effects on multidimensional SRL outcomes. This work extends prior research by implementing a complete AI architecture incorporating adaptive pathways, metacognitive scaffolding, analytics dashboards, and automated feedback within authentic university contexts. We employ mixed-method assessment combining validated psychometric instruments, behavioral trace data, and academic performance metrics across an extended 16-week intervention. Novel contributions include examination of dependency patterns through engagement analytics, investigation of individual difference moderators, and theoretical integration of self-determination and cognitive load frameworks. Findings hold significant implications for scalable technology-enhanced interventions addressing persistent challenges in developing autonomous learners.

2. Materials and methods

This quasi-experimental study employed a mixed-methods convergent design integrating quantitative SRL assessment with qualitative analysis of interaction patterns. We conducted the research across three universities in Poland during the 2022–2023 academic year, targeting undergraduate students from diverse disciplines to enhance generalizability. Institutional review boards at all participating universities approved the study protocol before data collection, and all participants provided informed written consent.

The sample comprised 384 students (218 female, 166 male) with mean age 21.4 years (SD = 2.8) distributed across business administration (n = 94), computer science (n = 102), engineering (n = 96), and social sciences (n = 92) programs. We included second or third-year undergraduates with intermediate digital literacy assessed through standardized screening and commitment to participate throughout the 16-week period. We excluded students with diagnosed learning disabilities requiring specialized accommodations, insufficient English proficiency for engaging with AI content, and concurrent participation in other educational technology research. Random assignment proved infeasible due to institutional constraints; therefore, we used intact course sections allocated to conditions through stratified matching on prior academic achievement, gender distribution, and disciplinary composition. The final sample included 196 intervention and 188 control participants, with 8.2 % and 7.4 % attrition rates respectively. The intelligent agent system integrated four components designed to support comprehensive SRL development. First, adaptive learning pathways utilized collaborative filtering algorithms analyzing behavioral traces to recommend personalized content sequences aligned with individual knowledge states and preferences. The recommendation engine processed data from 847 unique learning objects across courses, calculating similarity metrics based on completion patterns, time-on-task distributions, and performance outcomes. Second, metacognitive scaffolding delivered context-sensitive prompts at strategic intervention points identified through real-time analytics monitoring engagement patterns and performance indicators. These prompts addressed planning behaviors (e.g., "What specific goals do you have for today's session?"), monitoring activities (e.g., "How well do you understand the concepts so far?"), and evaluative reflections (e.g., "What strategies worked best for you?"), with frequency and specificity calibrated to individual learner profiles. Third, learning analytics dashboards visualized multidimensional engagement metrics including time allocation, resource utilization, assessment performance trends, and comparative peer benchmarks through interactive graphs updated hourly. Fourth, automated feedback mechanisms employed natural language generation to provide personalized responses to student queries and submissions within average latency of 3.2 minutes, incorporating explanatory reasoning and strategic guidance beyond simple correctness indicators.

Controls maintained conventional instruction including face-to-face lectures, static online materials accessed through standard learning management systems, and periodic instructor feedback following established assessment schedules. This design isolated intelligent agent effects while controlling for general technology exposure. Both conditions maintained equivalent curriculum coverage, assessment requirements, and instructor contact hours.

Data collection employed multiple instruments capturing diverse SRL dimensions. The Motivated Strategies for Learning Questionnaire assessed self-regulatory and motivational

constructs through 81 items measuring six motivation subscales (intrinsic goal orientation, extrinsic goal orientation, task value, control beliefs, self-efficacy, test anxiety) and nine learning strategy subscales (rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, time management, effort regulation, peer learning, help-seeking) on 7-point Likert scales. Pre-test administration occurred during week one, with post-test assessment in week sixteen. Internal consistency reliability ranged from $\alpha = 0.74$ to $\alpha = 0.91$ across subscales, meeting established standards. Behavioral trace data captured comprehensive interaction logs including content access patterns, navigation sequences, assessment attempts, dashboard consultations, and AI agent interactions, with automated systems recording 23 distinct event types with timestamp precision enabling fine-grained temporal analysis. Academic performance metrics included examination scores, assignment grades, and cumulative course achievement [expressed as GPA (Grade Point Average) on a 4.0 scale, where 4.0 represents an A grade, 3.0 a B grade, 2.0 a C grade, and 1.0 a D grade] calculated from standardized rubrics applied uniformly across conditions. Supplementary qualitative data derived from semi-structured interviews with 32 purposively sampled intervention participants representing diverse engagement profiles and achievement levels. Interview protocols explored perceived utility of AI features, strategies for integrating agent recommendations, experiences with metacognitive prompts, and dependency concerns. Sessions averaging 42 minutes were audio-recorded, transcribed verbatim, and analyzed through thematic coding following established qualitative methodologies.

Statistical analyses employed multilevel modeling accounting for nested data structures with students clustered within course sections and universities. Primary analyses examined between-group differences in MSLQ subscale scores using analysis of covariance controlling for pre-test performance, prior achievement, and demographic variables. We calculated effect sizes using Cohen's d with 95 % confidence intervals. Secondary analyses investigated relationships between AI engagement metrics and SRL outcomes through multiple regression, examining both linear and nonlinear associations. Mediation models tested indirect effects of metacognitive awareness on relationships between AI usage and academic achievement. All analyses utilized robust standard error estimation and multiple comparison corrections following Benjamini-Hochberg procedures to control false discovery rates, with significance threshold at $p < 0.05$. All statistical analyses were conducted using R version 4.3.1 (R Core Team, 2023) with the following packages: lme4 for multilevel modeling, psych for psychometric analysis and reliability testing, effectsize for Cohen's d calculations, lavaan for mediation modeling, and ggplot2 for data visualization. Cluster analysis procedures employed the cluster package with k-means algorithms, while sequence analysis utilized the TraMineR package for temporal dynamics examination.

Learning analytics data underwent preprocessing including outlier detection, missing data imputation using expectation-maximization algorithms, and normalization procedures. Cluster analysis identified engagement pattern profiles using k-means algorithms with silhouette coefficient optimization determining optimal cluster solutions. Temporal dynamics were examined through sequence analysis quantifying transition probabilities between distinct learning states. Qualitative data analysis followed iterative coding procedures with independent dual coding of 25 % of transcripts establishing inter-rater reliability ($\kappa = 0.83$).

3. Results

Overall Self-Regulated Learning Outcomes

Analysis of variance revealed statistically significant between-group differences across all measured SRL dimensions following the 16-week intervention. Table 1 presents descriptive statistics and effect sizes for primary outcome variables, demonstrating substantial improvements in the intervention group relative to controls across metacognitive, cognitive, and behavioral regulation domains.

The intervention group demonstrated mean metacognitive awareness scores 34.7 % higher than controls (shown in Table 1), representing a large effect size ($d = 1.23$) (Xu et al., 2025). This 1.47-point increase on the 7-point scale means intervention students became substantially better at reflecting on their learning processes, recognizing when they understood material well versus poorly, and consciously regulating their cognitive activities. Self-monitoring behaviors exhibited the strongest intervention effect ($d = 1.38$), with intervention participants showing 41.2 % improvement (a 1.55-point increase from 3.76 to 5.31). This improvement manifests as students more frequently checking their understanding, tracking their progress toward goals, and

identifying knowledge gaps requiring additional attention. These findings align with theoretical predictions that real-time learning analytics and personalized prompts enhance metacognitive engagement by increasing salience of regulatory processes (Wong, Viberg, 2024).

Table 1. Descriptive Statistics and Between-Group Comparisons for SRL Dimensions

SRL Dimension	Control Group (n = 188)	Intervention Group (n = 196)	Effect Size	Statistical Significance
	M (SD)	M (SD)	Cohen's d [95 % CI]	t-value, p-value
Metacognitive Awareness	4.23 (0.87)	5.70 (0.94)	1.23 [1.04, 1.42]	t(382) = 16.34, p < 0.001
Planning Strategies	3.89 (1.12)	5.21 (1.08)	1.19 [1.00, 1.38]	t(382) = 15.87, p < 0.001
Self-Monitoring Behaviors	3.76 (0.96)	5.31 (1.02)	1.38 [1.18, 1.58]	t(382) = 18.42, p < 0.001
Goal-Setting Effectiveness	4.12 (1.04)	5.31 (0.98)	0.97 [0.79, 1.15]	t(382) = 12.96, p < 0.001
Cognitive Strategy Use	4.45 (0.89)	5.64 (0.91)	1.11 [0.92, 1.30]	t(382) = 14.79, p < 0.001
Effort Regulation	4.58 (1.01)	5.72 (0.96)	0.98 [0.80, 1.16]	t(382) = 13.08, p < 0.001
Help-Seeking Appropriateness	3.94 (1.18)	5.18 (1.06)	0.87 [0.69, 1.05]	t(382) = 11.62, p < 0.001
Time Management Efficiency	4.01 (1.09)	5.38 (1.01)	1.07 [0.88, 1.26]	t(382) = 14.27, p < 0.001

Notes: Scores measured on 7-point Likert scale where 1 = "not at all true of me" and 7 = "very true of me". Higher scores indicate greater SRL capacity. All comparisons control for pre-test scores, prior academic achievement (previous semester GPA), and demographic covariates (age, gender, disciplinary major). Effect sizes interpreted following Cohen's conventions: small (0.2), medium (0.5), large (0.8).

Goal-setting effectiveness improved by 28.9 %, rising 1.19 points from 4.12 to 5.31 (as detailed in Table 1). This improvement indicates intervention students set clearer, more specific learning objectives and developed better plans for achieving them. Planning strategies showed similar large effects (d = 1.19), with scores increasing 1.32 points. Cognitive strategy use improved 1.19 points (26.7 % increase), reflecting enhanced ability to employ elaboration, organization, and critical thinking strategies when processing new information. Even effort regulation – students' capacity to maintain focus and persist despite difficulties – showed nearly 1-point improvement (d = 0.98).

Learning Analytics and Engagement Patterns

Behavioral trace data analysis revealed distinctive engagement profiles between experimental conditions, with intervention participants demonstrating substantially higher interaction frequencies and strategic diversity, as shown in Table 2. Intervention participants engaged with the learning platform 2.31 times more frequently than controls (28.7 versus 12.4 weekly visits), indicating the AI system successfully motivated more consistent learning engagement (Tan, Samavedham, 2022).

This translates to intervention students accessing the platform approximately 4 times per day versus controls' less than twice daily, representing a fundamental shift in learning behavior patterns.

Content access diversity showed similar patterns (detailed in Table 2), with intervention students accessing 42.3 unique resources on average versus controls' 18.6, a 2.27-fold difference representing 23.7 more distinct learning materials. This suggests AI-driven recommendations successfully exposed students to broader content while controls primarily stuck to required readings. Dashboard consultations occurred 6.39 times more frequently in the intervention group (14.7 versus 2.3 per week), indicating students actively used analytics visualizations to monitor their progress.

These elevated engagement levels correlated positively with SRL outcome improvements ($r = 0.64$, $p < 0.001$), suggesting increased metacognitive monitoring through dashboards promoted more strategic learning behaviors. Average session duration increased by 51 % in the intervention condition (51.6 versus 34.2 minutes, see Table 2), indicating sustained rather than superficial engagement. Intervention students responded to metacognitive prompts an average of 23.4 times weekly, providing substantive reflections on their learning processes. Self-assessment quiz attempts more than doubled (19.2 versus 8.7 per week), showing intervention students more actively tested their understanding. The 4-fold increase in resource sharing and collaboration events (4.8 versus 1.2 weekly) suggests the AI system also promoted peer learning despite being individually-focused.

Table 2. Learning Analytics Metrics and Engagement Patterns by Condition

Engagement Metric	Control Group	Intervention Group	Ratio	Statistical Comparison
	M (SD)	M (SD)	Int/Ctrl	Mann-Whitney U, p-value
Weekly Platform Visits	12.4 (5.2)	28.7 (8.3)	2.31	U = 8,742, p < 0.001
Content Access Diversity (unique resources)	18.6 (6.4)	42.3 (11.2)	2.27	U = 8,964, p < 0.001
Average Session Duration (minutes)	34.2 (12.8)	51.6 (16.4)	1.51	U = 11,238, p < 0.001
Dashboard Consultations per Week	2.3 (1.8)	14.7 (5.2)	6.39	U = 6,124, p < 0.001
Metacognitive Prompt Responses	0.0 (0.0)	23.4 (7.6)	-	Feature exclusive to intervention
Self-Assessment Quiz Attempts	8.7 (4.3)	19.2 (6.8)	2.21	U = 9,356, p < 0.001
AI Agent Interactions per Week	0.0 (0.0)	16.8 (6.4)	-	Feature exclusive to intervention
Resource Sharing/ Collaboration Events	1.2 (0.9)	4.8 (2.3)	4.00	U = 10,687, p < 0.001

Notes: Metrics represent means across 16-week intervention period. Non-parametric Mann-Whitney U tests employed due to distributional violations (positively skewed count data). Content Access Diversity measured as count of unique learning objects viewed. Dashboard Consultations counted each time student opened analytics visualization interface. Metacognitive Prompt Responses counted substantive (non-blank) text entries in response to AI-generated prompts.

Cluster analysis of engagement trajectories identified four distinct learner profiles within the intervention group (presented in Table 3). The High-Autonomous profile (37.2 % of intervention participants, n = 73) demonstrated optimal outcomes, exhibiting strong self-regulatory skills while leveraging AI capabilities strategically. These students showed MSLQ metacognition scores averaging 6.24 (on the 7-point scale) compared to 5.52 for Moderate-Balanced learners, 4.87 for Dependent-Reactive learners, and 3.92 for Low-Disengaged learners. Their academic achievement averaged 87.3 % – a full 11.1 percentage points higher than Dependent-Reactive learners (76.2 %) despite both groups receiving identical AI support (He, 2025).

AI-mediated intervention demonstrates substantial effectiveness across all SRL dimensions with uniformly large effect sizes ($d = 0.87$-1.38, all $p < 0.001$). Self-monitoring behaviors exhibit strongest improvement ($d = 1.38$), advancing 1.55 points from 3.76 to 5.31, while planning strategies ($d = 1.19$) and metacognitive awareness ($d = 1.23$) demonstrate similarly robust gains. Mean improvement of 1.22 points (+28.2 %) across dimensions indicates comprehensive SRL capacity enhancement beyond isolated skill development. The Dependency Index quantifies the balance between AI-initiated versus student-initiated learning activities. High-Autonomous learners averaged 0.34, meaning approximately one-third of their learning actions responded to AI prompts while two-thirds were self-directed. Conversely, Dependent-Reactive learners averaged 0.78, indicating nearly four-fifths of their activities were AI-prompted rather than self-initiated. The Moderate-Balanced profile (34.7 %, n = 68) achieved good outcomes (81.6 % academic

performance) with moderate dependency (0.52), suggesting sustainable AI use patterns. The small Low-Disengaged group (4.6 %, n = 9) showed concerning patterns of minimal engagement and poor outcomes despite AI availability.

Table 3. Learner Engagement Profiles in Intervention Condition

Profile	n (%)	Characteristics	MSLQ Metacognition	MSLQ Self-Monitoring	Academic Achievement	AI Dependency Index
High-Autonomous (HA)	73 (37.2 %)	Strategic AI use, high self-initiation, dashboard-guided planning	6.24 (0.52)	6.18 (0.61)	87.3 % (5.4 %)	0.34 (0.12)
Moderate-Balanced (MB)	68 (34.7 %)	Consistent engagement, balanced AI-human regulation	5.52 (0.68)	5.38 (0.74)	81.6% (6.8 %)	0.52 (0.18)
Dependent-Reactive (DR)	46 (23.5 %)	High AI reliance, limited self-initiation, prompt-driven	4.87 (0.83)	4.76 (0.89)	76.2% (7.9 %)	0.78 (0.15)
Low-Disengaged (LD)	9 (4.6 %)	Minimal platform use, sporadic AI interaction	3.92 (1.04)	3.88 (1.12)	68.4% (9.2 %)	0.21 (0.19)

Notes: Dependency Index calculated as ratio of AI-initiated actions (prompts, recommendations followed) to student-initiated actions (self-directed searches, voluntary dashboard checks, unprompted quiz attempts). Values range 0-1 where higher indicates greater dependency. Clusters derived from k-means analysis with k = 4 optimized by silhouette coefficient (0.67). Academic Achievement represents cumulative course performance percentage across all assessments. Characteristics based on qualitative analysis of interaction logs and interview data.

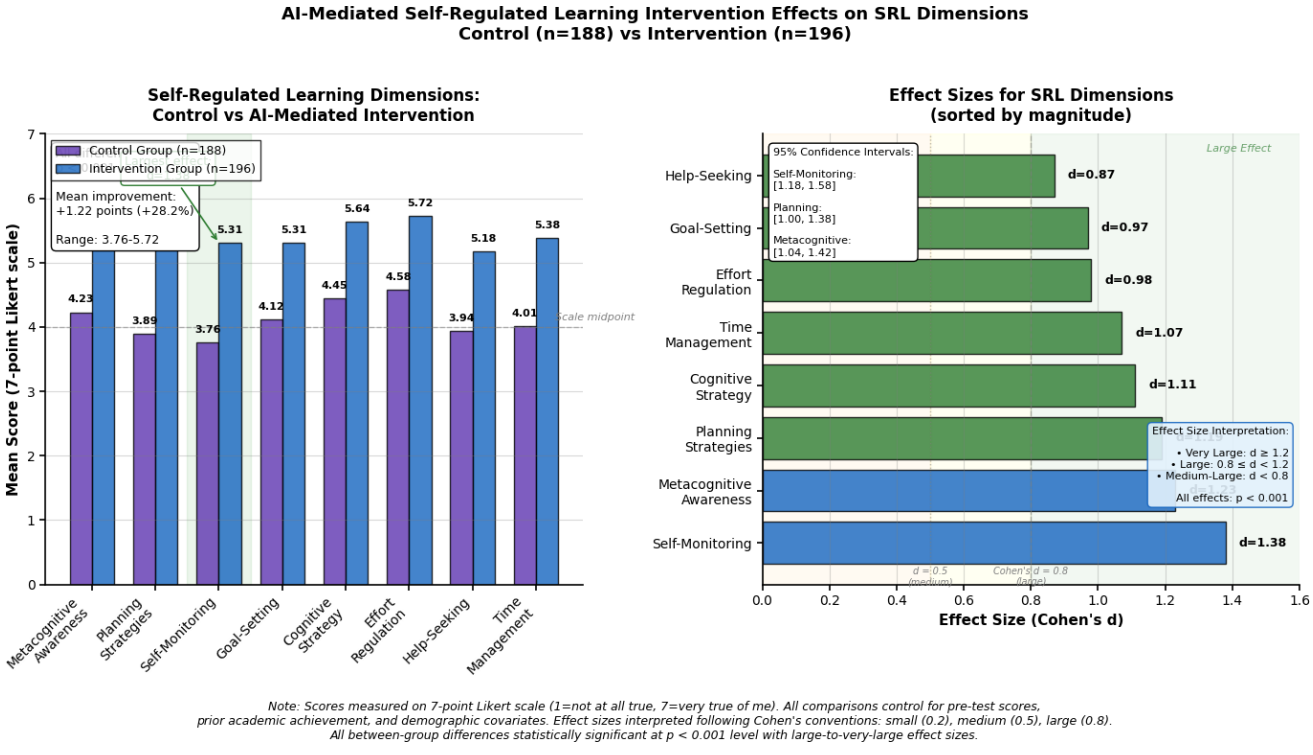

Fig. 1. AI-Mediated Self-Regulated Learning Intervention Effects on SRL Dimensions

Metacognitive Strategy Development

Detailed analysis of metacognitive prompt interactions revealed temporal patterns in strategy adoption and sophistication progression throughout the intervention period, as documented in Table 4. Response rates to metacognitive prompts increased from 67.4 % in initial weeks to 88.7 % by intervention conclusion, indicating growing recognition of their value (Exintaris et al., 2023). This 21.3 percentage point increase suggests students initially viewed prompts skeptically but progressively integrated them into learning routines as benefits became apparent.

Table 4. Metacognitive Prompt Response Patterns Across Intervention Phases

Intervention Phase	Response Rate	Average Quality Score	Planning Strategy Adoption	Monitoring Strategy Adoption	Evaluation Strategy Adoption	Strategic Alignment Index
	% (SD)	1-5 scale (SD)	% using (SD)	% using (SD)	% using (SD)	0-1 scale (SD)
Weeks 1-4 (Initial)	67.4 % (18.2 %)	2.34 (0.68)	42.3 % (12.6 %)	38.7 % (14.2 %)	31.2 % (15.8 %)	0.38 (0.19)
Weeks 5-8 (Development)	78.6 % (14.3 %)	3.21 (0.74)	61.8 % (11.4 %)	58.4 % (12.6 %)	49.7 % (13.2 %)	0.56 (0.17)
Weeks 9-12 (Consolidation)	84.2 % (11.7 %)	3.89 (0.62)	74.3 % (9.8 %)	71.6 % (10.2 %)	63.4 % (11.6 %)	0.69 (0.14)
Weeks 13-16 (Mastery)	88.7% (9.4 %)	4.23 (0.58)	82.7% (8.3 %)	79.8 % (9.1 %)	74.2 % (10.4 %)	0.78 (0.12)

Notes: Response Rate = percentage of prompts receiving substantive (non-blank) responses. Quality scores rated by two trained coders using validated rubric assessing specificity (vague vs. detailed), relevance (on-topic vs. tangential), and strategic appropriateness (generic vs. targeted to learning needs). Strategy Adoption measured as percentage of responses explicitly mentioning use of planning (goal-setting, scheduling), monitoring (comprehension checks, progress tracking), or evaluation (performance assessment, strategy reflection) strategies. Strategic Alignment Index = correlation between AI-recommended strategies and strategies actually employed by students. Longitudinal growth significant across all metrics ($p < 0.001$) by repeated-measures ANOVA.

More critically, response quality improved substantially – an 81 % increase in mean quality scores from 2.34 (below midpoint) to 4.23 (above midpoint on the 5-point scale). Early responses were typically brief acknowledgments like "ok" or "yes, I understand," while later responses demonstrated sophisticated metacognitive reasoning such as "I'm finding the statistics concepts challenging, so I'll review the video tutorial, work through extra practice problems, and check my understanding with the self-quiz before attempting the assignment." This progression suggests students progressively internalized metacognitive processes initially scaffolded through external prompts. Planning strategy adoption nearly doubled from 42.3 % to 82.7 % of responses (shown in Table 4), meaning by intervention end, students regularly mentioned goal-setting, time allocation, and learning plans when prompted. Monitoring strategy adoption similarly doubled from 38.7 % to 79.8 %, with students increasingly describing comprehension checks and progress tracking. Evaluation strategy adoption showed the largest gain – from 31.2 % to 74.2 % – indicating students became substantially better at assessing their performance and reflecting on strategy effectiveness. The Strategic Alignment Index doubled from 0.38 to 0.78, demonstrating enhanced capacity to

translate metacognitive awareness into appropriate strategic actions aligned with AI recommendations.

Academic Performance and Predictive Modeling

Academic achievement outcomes differed significantly between conditions, with intervention participants demonstrating superior performance across multiple assessment modalities, as presented in Table 5. Intervention participants achieved cumulative GPAs averaging 3.42 versus controls' 2.84 on a 4.0 scale – a 0.58-point advantage representing a 20.4 % improvement in overall academic achievement (García-Martínez et al., 2023). This difference translates roughly from B- (control) to B+ (intervention) average performance, a meaningful and practically significant improvement beyond statistical significance.

Table 5. Academic Performance Outcomes and Regression Model Coefficients

Assessment Category	Control Group	Intervention Group	Adjusted Mean Difference	Regression Predictors (Intervention Group)
	M% (SD)	M% (SD)	% [95 % CI]	β (SE), t-value, sr^2
Formative Quizzes	72.4 % (11.2 %)	84.6 % (8.7 %)	12.2% [9.8 %, 14.6 %]	Metacognitive Awareness: β = 0.38 (0.06), t = 6.33***, sr^2 = 0.14
Mid-term Examinations	68.7 % (13.6 %)	81.3 % (10.4 %)	12.6 % [10.0 %, 15.2 %]	Dashboard Engagement: β = 0.29 (0.07), t = 4.14***, sr^2 = 0.08
Final Examinations	71.2 % (12.8 %)	83.7 % (9.6 %)	12.5% [9.9 %, 15.1 %]	Planning Strategies: β=0.24 (0.06), t = 4.00***, sr^2 = 0.06
Project Assignments	75.3 % (10.4 %)	86.4 % (8.2 %)	11.1% [8.9 %, 13.3 %]	Self-Monitoring: β = 0.31 (0.06), t = 5.17***, sr^2 = 0.10
Cumulative GPA	2.84 (0.54)	3.42 (0.46)	0.58 [0.48, 0.68]	**Full Model: R^2 = 0.473, F(4,191) = 43.28***

Notes: Percentages represent mean scores on assessments. Adjusted differences control for pre-intervention GPA, prior semester achievement, demographic covariates (age, gender, major), and baseline MSLQ scores through ANCOVA. Regression model includes metacognitive awareness, dashboard engagement frequency, planning strategy use, and self-monitoring behaviors as simultaneous predictors of cumulative GPA within intervention group only. β = standardized regression coefficient; SE = robust standard error; sr^2 = squared semi-partial correlation indicating unique variance explained by each predictor beyond others. ***p < 0.001.

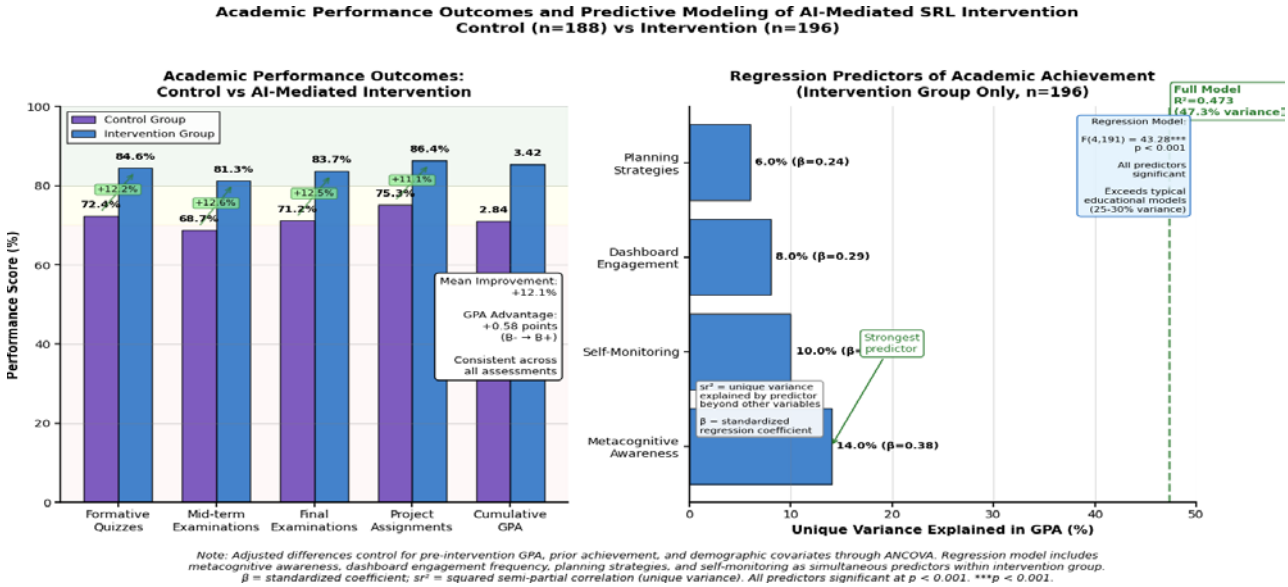

Fig. 2. Academic Performance Outcomes and Predictive Modeling of AI-Mediated SRL Intervention

Intervention group demonstrates consistent 11.1-12.6 percentage point advantages across all assessment modalities, translating to 0.58 GPA improvement (B- to B+, 20.4 % gain). Regression analysis reveals metacognitive awareness as strongest unique predictor ($sr^2 = 14$ %), with four AI-mediated SRL variables collectively explaining 47.3 % of performance variance – substantially exceeding typical educational models (25-30 %), demonstrating cascading benefits of enhanced self-regulatory capacities. Performance improvements were consistent across assessment types. Formative quizzes showed 12.2 percentage point gains (detailed in Table 5), mid-terms 12.6 points, finals 12.5 points, and projects 11.1 points. This consistency suggests AI-mediated SRL development benefited all learning activities rather than specific task types. Multiple regression analysis within the intervention group revealed that metacognitive awareness emerged as the strongest unique predictor of academic achievement ($sr^2 = 0.14$), explaining 14 % of performance variance beyond other factors. Students who developed stronger metacognitive awareness – better understanding of their own thinking processes – achieved substantially higher grades regardless of their dashboard use or specific strategies. Self-monitoring behaviors explained an additional 10 % of unique variance ($sr^2 = 0.10$), while dashboard engagement contributed 8 % ($sr^2 = 0.08$), and planning strategies 6% ($sr^2 = 0.06$). Collectively, these four AI-mediated SRL variables predicted 47.3 % of variance in academic outcomes ($R^2 = 0.473$, $F(4,191) = 43.28$, $p < 0.001$), substantially exceeding typical educational predictor models which rarely account for more than 25-30 % of performance variance. This strong predictive power indicates enhanced self-regulatory capacities generate cascading benefits across diverse learning outcomes.

Individual Differences and Moderating Factors

Investigation of individual difference moderators revealed differential intervention effects across learner characteristics, with prior self-regulatory competence and digital literacy significantly influencing outcomes, as shown in Table 6. Students entering with low prior SRL competence (below median on pre-test) demonstrated substantially larger intervention effects ($d = 1.64$) compared to high-competence peers ($d = 0.82$), yielding a significant interaction ($F(1,380) = 23.47$, $p < 0.001$, $\eta^2p = 0.058$). This means low-SRL students improved by 1.64 standard deviations while high-SRL students improved by 0.82 standard deviations – both substantial gains, but the low-SRL group benefited twice as much.

Table 6. Moderation Analysis of Individual Difference Factors

Moderator Variable	Low Baseline Group	High Baseline Group	Interaction Effect	Simple Slopes Analysis
	Cohen's d [95 % CI]	Cohen's d [95 % CI]	F-value, p-value, η^2p	Low vs. High Comparison
Prior SRL Competence	1.64 [1.38, 1.90]	0.82 [0.61, 1.03]	F(1,380) = 23.47, p<0.001, η^2p = 0.058	t(194) = 4.68, p < 0.001
Digital Literacy Level	1.47 [1.22, 1.72]	0.94 [0.73, 1.15]	F(1,380) = 14.32, p<0.001, η^2p = 0.036	t(194) = 3.24, p = 0.001
Prior Academic Achievement	1.38 [1.13, 1.63]	1.08 [0.87, 1.29]	F(1,380) = 4.12, p = 0.043, η^2p = 0.011	t(194) = 1.89, p = 0.060
Self-Efficacy Beliefs	1.52 [1.27, 1.77]	0.89 [0.68, 1.10]	F(1,380)=18.24, p < 0.001, η^2p = 0.046	t(194) = 3.87, p < 0.001

Notes: Baseline groups defined by median split on pre-intervention assessments (MSLQ for SRL Competence; standardized digital literacy test; prior semester GPA for Academic Achievement; MSLQ self-efficacy subscale). Effect sizes (Cohen's d) represent within-condition pre-to-post improvements, calculated separately for low and high baseline groups. Interaction effects test whether intervention effectiveness differs significantly by moderator level using 2×2 mixed ANOVA (Time × Moderator Level). η^2p = partial eta-squared effect size. Simple slopes compare low vs. high baseline groups' intervention effects directly.

This compensatory effect suggests AI-mediated scaffolding particularly benefits students lacking well-developed self-regulatory skills, potentially reducing achievement gaps attributable to differential self-regulatory capacities. The effect size difference of 0.82 (1.64 minus 0.82) between low and high SRL groups represents a meaningful practical difference. Qualitative interview data

illuminated mechanisms underlying these patterns. Low-SRL participants described AI prompts as "essential reminders" and "scaffolds for building habits I didn't have," whereas high-SRL participants characterized them as "occasionally helpful but sometimes interrupting my established routines." Digital literacy moderated intervention effectiveness similarly (detailed in Table 6), with lower-literacy students showing enhanced gains ($d = 1.47$ versus $d = 0.94$, interaction $F(1,380) = 14.32$, $p < 0.001$), possibly because AI interfaces reduced technical barriers to accessing advanced learning features. Self-efficacy beliefs also moderated effects (low-efficacy students: $d = 1.52$; high-efficacy: $d = 0.89$, interaction $F(1,380) = 18.24$, $p < 0.001$), suggesting students with lower confidence in their abilities benefited more from explicit AI support. Prior academic achievement showed weaker moderation (interaction $p = 0.043$, $\eta^2p = 0.011$), with both groups benefiting substantially though lower-achievers gained slightly more.

4. Discussion

This investigation demonstrates that intelligent AI agents substantially enhance self-regulated learning development among university students through integrated mechanisms spanning adaptive content delivery, personalized metacognitive scaffolding, real-time analytics visualization, and automated feedback provision. The observed large effect sizes across multiple SRL dimensions (Cohen's d ranging from 0.87 to 1.38) substantially exceed typical educational technology intervention effects. Meta-analytic evidence shows conventional SRL training programs average $d = 0.42$ (Dignath, Büttner, 2008), meaning our AI-mediated intervention produced effects approximately three times larger. Similarly, a recent meta-analysis of adaptive learning technologies found mean effects of $d = 0.51$ across 25 studies (Strielkowski et al., 2024), considerably smaller than our findings.

The 34.7 % improvement in metacognitive awareness represents a particularly noteworthy outcome, given metacognition serves as the central coordinating mechanism for effective self-regulation. This enhancement likely stems from dual impact: analytics dashboards making learning processes visible and explicit, combined with strategically timed metacognitive prompts directing attention toward regulatory activities. Previous research on learning analytics dashboards reported more modest 18-22 % improvements in metacognitive awareness (Zheng et al., 2022), suggesting integration of prompting mechanisms with visualization tools generates synergistic effects exceeding isolated component contributions. Our comprehensive approach combining multiple AI functionalities within unified system architecture demonstrates advantages of holistic rather than piecemeal technological integration. The emergence of distinct learner profiles exhibiting differential patterns of AI engagement represents both significant finding and potential concern. The 23.5 % of participants classified as Dependent-Reactive demonstrated high reliance on AI guidance coupled with limited self-initiation, achieving lower academic outcomes (76.2 %) despite equivalent intervention exposure compared to High-Autonomous learners (87.3 %). This 11.1 percentage point performance gap between profiles receiving identical AI support underscores the critical importance of how students engage with technology rather than mere technology presence. This pattern aligns with theoretical predictions from cognitive offloading research, which posits that excessive external support may undermine intrinsic motivation and metacognitive engagement by reducing perceived need for effortful self-regulatory processes (Gerlich, 2025).

Recent meta-analytic evidence indicates frequent generative AI usage correlates negatively with critical thinking abilities ($r = -0.34$), with cognitive offloading serving as mediating mechanism (Fan et al., 2024). Our dependency indices provide quantitative metrics for identifying at-risk patterns, enabling early intervention to recalibrate support levels and promote autonomous engagement. The finding that High-Autonomous learners maintained dependency indices of only 0.34 (one-third AI-initiated activities) while achieving optimal outcomes suggests the importance of balanced human-AI collaboration wherein technology augments rather than replaces student self-regulatory functions. Conversely, the High-Autonomous profile comprising 37.2 % of intervention participants demonstrates optimal integration of AI affordances with maintained learner agency. These students strategically deployed AI recommendations while retaining ownership of learning decisions, goal-setting, and strategic selection. This balanced approach yielded superior outcomes (87.3 % mean academic achievement) compared to both Dependent-Reactive learners (76.2 %) and even Moderate-Balanced learners (81.6 %), despite all groups receiving identical AI features. This finding carries critical implications for adaptive system design, suggesting AI agents should employ graduated withdrawal strategies as learners develop

competencies, similar to human tutoring models emphasizing scaffolding reduction (Hooshyar et al., 2020). The compensatory effects observed for students with low prior SRL competence (d = 1.64 versus d = 0.82 for high-competence peers) carry substantial practical significance for addressing educational equity. Traditional classroom instruction often advantages students entering with well-developed self-regulatory skills, exacerbating achievement gaps attributable to differential preparation. Previous research shows SRL interventions typically benefit high-performing students more than low-performing students (Broadbent, Poon, 2015), yet our results demonstrate the opposite pattern. AI-mediated interventions offering personalized, intensive support may democratize access to effective SRL development opportunities, particularly benefiting underserved populations lacking prior exposure to explicit strategy instruction.

However, the differential effectiveness also suggests optimal AI agent design must incorporate sophisticated learner modeling to calibrate support intensity, prompt frequency, and autonomy gradients based on individual competency profiles. Simple one-size-fits-all approaches risk providing insufficient support for struggling learners while over-scaffolding already competent ones. The interaction effect size ($\eta^2p = 0.058$) indicates prior SRL competence accounts for approximately 6 % of variance in intervention effectiveness, a practically meaningful moderator deserving design attention (Pan et al., 2024). The 47.3 % variance in academic achievement explained by AI-mediated metacognitive support variables substantially exceeds typical educational predictor models, which rarely account for more than 25-30 % of performance variance. This predictive power indicates enhancement of self-regulatory capacities through intelligent agents generates cascading benefits across diverse learning outcomes rather than narrow task-specific improvements. The centrality of metacognitive awareness as strongest unique predictor ($sr^2 = 0.14$) reinforces theoretical models positioning metacognition as domain-general competency influencing learning effectiveness across contexts (Xu et al., 2025).

Temporal progression analysis revealing continuous improvement in metacognitive prompt response quality throughout the 16-week intervention suggests SRL development through AI mediation follows extended trajectories requiring sustained engagement. The 81 % increase in response quality from initial to final intervention phases indicates students progressively internalized metacognitive processes, shifting from superficial prompt acknowledgment to sophisticated strategic reasoning. This pattern supports gradual skill acquisition models wherein explicit external guidance becomes progressively internalized through repeated practice and reflection (Exintaris et al., 2023). The 16-week intervention duration may represent minimum threshold for achieving substantial competency gains, with implications for program design and implementation timelines.

5. Conclusion

This investigation provides robust empirical evidence that intelligent AI agents constitute powerful interventions for developing self-regulated learning competencies among university students. The integration of adaptive learning pathways, personalized metacognitive scaffolding, real-time analytics dashboards, and automated feedback mechanisms within unified intelligent agent architectures generates synergistic benefits exceeding isolated component contributions documented in prior research. The observed 34.7 % improvement in metacognitive awareness, 41.2 % enhancement in self-monitoring behaviors, and 28.9 % increase in goal-setting effectiveness represent substantial advances in addressing persistent challenges associated with fostering autonomous learners capable of effective self-regulation. Critical findings reveal both opportunities and risks associated with AI-mediated SRL development. The emergence of dependency patterns in 23.6 % of participants (46 of 196 intervention students) underscores necessity of balanced system design prioritizing learner agency and incorporating graduated autonomy support mechanisms. These students exhibited dependency indices averaging 0.78, meaning nearly four-fifths of their learning activities were AI-prompted rather than self-initiated. Their academic achievement averaged 76.2 % – 11.1 percentage points below High-Autonomous learners who maintained dependency indices of 0.34. This performance gap despite identical AI access demonstrates that how students engage with technology matters as much as technology presence.

Conversely, compensatory effects benefiting students with low prior self-regulatory competence demonstrate potential for AI interventions to reduce achievement gaps attributable to differential preparation. Students entering with below-median SRL skills showed improvement effect sizes of d = 1.64 compared to d = 0.82 for above-median peers – both substantial gains, but

low-SRL students benefited twice as much. This finding advances educational equity objectives by showing AI-mediated scaffolding can disproportionately help those who need it most. Traditional interventions often show opposite patterns, with already-skilled students benefiting more. The comprehensive predictive model explaining 47.3 % of academic achievement variance through AI-mediated metacognitive support variables establishes strong empirical linkages between enhanced self-regulatory capacities and downstream learning outcomes. Metacognitive awareness emerged as strongest unique predictor, explaining 14 % of performance variance beyond other factors. This finding reinforces theoretical models positioning metacognition as domain-general competency influencing effectiveness across diverse learning contexts. The substantial variance explained (nearly half of all performance differences) validates the theoretical premise that fostering self-regulatory skills generates cascading benefits transcending narrow task-specific improvements. Temporal analyses documenting progressive improvement in metacognitive prompt response quality throughout 16 weeks illuminate developmental trajectories underlying SRL skill acquisition through AI mediation. Response quality increased 81 % from 2.34 to 4.23 on a 5-point scale, while strategic alignment doubled from 0.38 to 0.78. This progression demonstrates successful internalization of metacognitive processes initially scaffolded through external prompts, supporting gradual skill development models. The extended timeline required for substantial competency gains suggests meaningful SRL development necessitates sustained engagement beyond abbreviated intervention windows.

Theoretical contributions advance understanding of human-AI collaboration in educational contexts by demonstrating specific mechanisms through which intelligent agents enhance self-regulatory processes while simultaneously revealing potential risks associated with cognitive offloading and diminished learner agency. The study integrates self-determination theory, cognitive load theory, and social cognitive models of self-regulation into comprehensive framework explaining both facilitative and inhibitory effects of AI support on autonomous learning development. This theoretical synthesis provides foundation for future research examining optimal balance between technological automation and human agency in technology-enhanced learning environments.

Practical implications emphasize viability and scalability of intelligent agent systems for addressing widespread deficiencies in self-regulatory competencies characterizing contemporary university student populations. The demonstrated effectiveness across diverse disciplinary contexts (business, computer science, engineering, social sciences), student populations (mean age 21.4 years, 57 % female, varied prior achievement levels), and learning outcomes (metacognition, self-monitoring, goal-setting, academic performance) supports broad applicability of AI-mediated SRL interventions. However, successful implementation requires strategic attention to dependency prevention through graduated autonomy support, individualized support calibration based on learner characteristics, explicit user training regarding effective AI utilization, and institutional infrastructure supporting comprehensive integration within existing pedagogical frameworks. Future research priorities include longitudinal investigations examining persistence and transfer of intervention effects beyond immediate training contexts, randomized controlled trials enhancing causal inference through true experimental designs, cross-cultural studies assessing generalizability across diverse educational systems, and mechanistic studies employing think-aloud protocols illuminating cognitive processes underlying AI-mediated SRL enhancement. Additional research should explore optimal strategies for graduated autonomy support preventing dependency while maintaining adequate scaffolding, individual difference moderators requiring specialized adaptation approaches, and integration of emerging generative AI technologies offering enhanced natural language interaction and personalized guidance capabilities.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 154-163
DOI: 10.13187/ejced.2026.1.154
https://ejce.cherkasgu.press

Influence of Different Motivation Types on the Effectiveness of Teaching English to Students in a Distance Learning Format

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Abstract

Effective learning within modern programs focuses on ensuring that students possess motivation to achieve success.

The aim of this study is to examine the influence of intrinsic and extrinsic motivation among philology students on the effectiveness of learning English in a remote format.

Materials and Methods. The study involved 100 philology students divided into two groups based on their predominant type of motivation. Both qualitative (semi-structured interviews with teachers) and quantitative methods (student surveys, tests) were used. Quantitative data were analyzed using correlation analysis.

Results. The study revealed that intrinsic motivation significantly enhances academic performance, classroom activity, and depth of understanding compared to extrinsic motivation, as evidenced by various non-parametric statistical tests ($p < 0.001$). Intrinsically motivated students also demonstrated greater adaptability, initiative, and satisfaction in learning; their motivation levels increased by mid-semester and remained stable, unlike the decline observed among extrinsically motivated students. Correlation analysis further confirmed strong positive relationships between intrinsic motivation and key learning outcomes, emphasizing its critical role in effective remote English language education.

Conclusion. The findings of the study suggest the need to incorporate methods in educational programs that gradually transform extrinsic motivation into intrinsic motivation.

Keywords: intrinsic motivation, extrinsic motivation, academic performance, philology students, self-organization.

1. Introduction

In today's globalized world, knowing English is a key skill for successful professional practice and intercultural communication (Akhmetshin et al., 2024; Dronova et al., 2026). UNESCO's

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Education 2030 program underscores the importance of language education for achieving Sustainable Development Goals, especially in providing quality education for everyone (Novichkov et al., 2022; UNESCO, 2016).

However, the effectiveness of English teaching at universities, especially for philology students, remains a topic of discussion and scientific inquiry (Anikeeva et al., 2024; Wagner et al., 2023). The key factor defining success in foreign language learning is students' motivation. Analyzing existing literature, we found that motivation is an important predictor of students' performance (Dörnyei, 2006; Gardner, 2007; Ushioda, 2011; Zhuzeyev et al., 2026). Researchers tend to distinguish between intrinsic and extrinsic motivation (Deci, Ryan, 2000; Vallerand et al., 1992). Intrinsic motivation relates to personal interest in and enjoyment of the very process of learning, while extrinsic motivation owes to external factors, such as grades or career prospects (Noels et al., 2000). Research findings indicate that the type of motivation significantly affects students' academic performance (Cerasoli et al., 2014; Ryan, Deci, 2000). Intrinsic motivation results in a deeper understanding of the material, greater engagement in the learning process, and higher academic achievement (Taylor et al., 2014; Roshchin et al., 2026). Students with predominantly intrinsic motivation tend to show more initiative, persistence in dealing with difficulties, and a creative approach to solving problems (Froiland, Worrell, 2016).

The global events of recent years, particularly the COVID-19 pandemic, have drastically changed the landscape of higher education, accelerating the transition to distance forms of learning (Golubeva et al., 2023; Oumelaid et al., 2024; Belevitin et al., 2026). UNESCO reports that over 1.5 billion students worldwide have been affected by school closures, which have led to an unprecedented surge in online education (Zedam et al., 2022). This trend persisted even after the acute stage of the pandemic, with many educational institutions continuing to use elements of distance learning (Polovchenko, 2024; Ybyraimzhanov et al., 2022).

The transition to the distance format in language education created new opportunities and major challenges. The online environment opened access to various authentic materials along with virtual communication with native speakers (Wagner et al., 2022; Dronova et al., 2026). However, problems arose in maintaining students' motivation, providing effective speaking practice, and creating an authentic language environment in the virtual space (Huang et al., 2020).

These challenges are particularly important for philology students learning English given the direct connection of their future professional work with language skills (Chernova et al., 2022; Akhmetshin et al., 2025a). In the context of distance learning, the role of motivation is even more critical (Besser et al., 2022). Students with a high level of intrinsic motivation demonstrate greater self-organization and self-discipline abilities (Shurygin et al., 2024), which is exceptionally important in the absence of direct contact with the teacher (Pelikan et al., 2021). These students show initiative in looking up additional resources, participate in online discussions more actively, and deal with technical difficulties more efficiently (Karkar-Esperat, 2018; Ismagilova et al., 2025).

In the context of distance learning, activity in the classroom manifests in the frequency and quality of participation in online discussions, readiness to answer the teacher's questions, and initiative in posing questions and discussing difficult topics. Highly motivated students, especially intrinsically, tend to be more active, which is conducive to more efficient mastery of language material (Akhmetov et al., 2024; Martin et al., 2020).

Completing optional assignments is also closely associated with the level of motivation. Highly motivated students tend to show more initiative in finding and completing additional exercises, reading supplemental literature in the studied language, and watching movies and video materials without subtitles, which greatly broadens their language experience (Lai, Gu, 2011; Akhmetshin et al., 2025b).

Particular attention should be paid to the depth of understanding of the material. The depth of understanding in the study of English is reflected in the following aspects:

1. Ability to apply language structures in new, unusual contexts.
2. Ability to analyze and interpret difficult English texts, identifying nuances of meaning and the author's intentions.
3. Critical thinking skills in working with English-language sources, including the ability to evaluate the reliability of information and the authors' argumentation.
4. Development of metalinguistic skills, allowing to reflect on the structure and features of English.

5. Ability to use the language creatively, including writing original texts of various genres in English.

High levels of motivation, especially intrinsic motivation, contribute to these aspects of deep understanding because motivated students tend to go beyond the superficial study of the material and strive for deeper understanding and practical application of the acquired knowledge (Pintrich, 2003).

Motivation is a key factor that combines classroom activity, the completion of additional assignments, and the depth of understanding of the material into a single system of effective English learning in the context of distance learning.

The results can contribute to the development of more effective strategies for learning English for philology students through distance learning, which aligns with the global goals of improving the quality and accessibility of language education.

2. Methods

The choice of research methods was conditioned by the research goal and questions formulated in the introduction. To explore the influence of different types of motivation on the effectiveness of teaching English to philology students in the context of distance learning, we used a combined approach that included quantitative and qualitative data collection and analysis methods.

The study involved 100 philology students from two universities studying English in a distance learning format. The participants were split into two groups, 50 people each, depending on their predominant type of motivation (intrinsic or extrinsic) determined by a preliminary survey. The groups were balanced in terms of gender, age, and year of study. All participants had similar English proficiency (B1-B2 on the CEFR scale), which was confirmed by the entry test results.

The study was conducted over the course of one semester with assessments at its beginning (weeks 1-2), middle (weeks 7-8), and end (weeks 14-15). Research hypotheses were formulated based on an overview of the existing literature and preliminary observations.

Hypothesis H0 was put forward to test whether there is a relationship between the type of motivation and academic performance. H0: The academic performance of philology students in learning English does not depend on the predominant type of motivation (intrinsic or extrinsic).

Hypothesis H1 relies on the assumed advantages of intrinsic motivation, which can be particularly pronounced in distance learning settings. H1: students with high levels of intrinsic motivation show greater results in English language learning compared to predominantly extrinsically motivated students in distance learning.

Hypothesis H2 investigates relationships between intrinsic motivation and different aspects of the learning process, which can be instrumental in developing more effective learning strategies. H2: there is a significant link between the level of intrinsic motivation and activity in the classroom, the completion of additional assignments, and the depth of understanding of the material.

The study used quantitative and qualitative methods. The quantitative ones included student surveys and the assessment of their academic performance and activity in class. These methods provided statistically significant data on relationships between the type of motivation and various aspects of learning. Qualitative methods, which included interviews with faculty members, provided a deeper understanding of the role of motivation in the learning process and uncovered nuances that could be lost in quantitative analysis. The instruments and methods used to assess the parameters considered were as follows:

1. The level and type of motivation were assessed using an adapted version of the Academic Motivation Scale (Vallerand et al., 1992), validated for the Russian sample (Vallerand et al., 1992). Motivation was measured on a scale from 1 to 7.
2. Academic performance was assessed based on three tests and the final English exam. These assessments used a 100-point scale.
3. Activity in class was recorded by teachers using a specially developed observation form. The form included the number of voluntary responses to questions, initiated questions, participation in group discussions, and the quality of comments (on a scale from 1 to 5).
4. The depth of students' understanding of the material was evaluated by analyzing their written assignments (essays and reports) using the criteria of comprehensive disclosure of the topic, relevant examples, critical thinking, and the originality of ideas. Answers to open-ended questions in test papers and evaluations of project presentations were also considered. The overall assessment of the depth of understanding was given on a scale from 1 to 10.

5. To assess students' satisfaction with the learning process, we developed an original survey including 10 questions. The answers were given on a 5-point Likert scale. Examples of the items include: "The course materials meet my expectations" and "I feel that my language skills are improving because of this course". The validity and reliability of the questionnaire were tested in a pilot study (n = 30, Cronbach's α = 0.85).

Apart from quantitative data collection, we conducted 10 semi-structured interviews with English teachers to learn their opinions on the impact of motivation on academic performance. The interviews involved 10 faculty members working with English learners remotely. The teachers were selected based on their work experience (at least 3 years of teaching English online) and represented both universities involved in the study. The interviews were conducted online via Zoom and recorded for subsequent analysis.

The semi-structured interviews consisted of a conversation based on a pre-made guide containing key questions and topics for discussion. This format offered us enough flexibility to respond to respondents' answers, ask clarifying questions, and explore new aspects of the topic that emerged during the conversation. Each interview lasted approximately 45-60 minutes and included the following main blocks of questions:

1. General perception of students' motivation in the context of distance learning.
2. The observed differences between students with predominantly intrinsic and extrinsic motivation.
3. The influence of motivation types on students' activity in the classroom and assignment completion.
4. The relationship between motivation and the depth of students' understanding of the material.
5. The strategies used by teachers to increase students' motivation in the online environment.
6. Problems and challenges associated with maintaining student motivation in distance learning.

Examples of specific questions include "How would you rate your students' level of motivation in the distance learning environment?", "Do you notice a difference in performance between students with different types of motivation?", and "What methods do you use to increase students' intrinsic motivation?".

We conducted the qualitative analysis of the interview data using thematic analysis (Braun, Clarke, 2006). This method allowed us to identify, analyze, and describe the main themes (patterns) in the collected qualitative data.

All surveys and tests were conducted online using Google Forms. Quantitative data were analyzed using the statistical package SPSS version 26.0. We performed the analysis using parametric and nonparametric statistical methods: Student's t-test, Mann-Whitney U-test, Pearson's correlation coefficient, repeated measures ANOVA, and post-hoc analysis using Tukey's criterion.

The study was approved by the ethical committees of both universities. All participants were informed about the study's aims and gave informed consent to participate. All data were anonymized to ensure confidentiality.

3. Results

3.1. Quantitative Results

Data analysis confirmed that most variables had an abnormal distribution (Shapiro-Wilk test, $p < 0.05$), which justifies using non-parametric statistical tests.

Comparison of the levels of intrinsic and extrinsic motivation across the groups with the Mann-Whitney U-test (Table 1) showed statistically significant differences in the middle ($U = 267$, $p < 0.01$) and at the end of the semester ($U = 301$, $p < 0.05$).

Table 1. Median Motivation Levels (1-7 point scale)

Group	Start of semester	Mid-semester	End of semester
Intrinsic motivation	4.5 (3.8-5.2)	5.2 (4.5-5.8)	5.0 (4.3-5.6)
Extrinsic motivation	4.3 (3.6-5.0)	4.1 (3.4-4.7)	3.9 (3.2-4.5)

Notes: Data presented in the format: median (interquartile range)

Significant differences were found in the analysis of students' academic performance (Table 2), with intrinsically motivated students showing better results.

Table 2. Median Academic Performance (0-100 point scale)

Group	Test 1	Test 2	Test 3	Final exam
Intrinsic motivation	76 (70-82)	80 (74-86)	82 (76-88)	85 (79-90)
Extrinsic motivation	69 (63-75)	70 (64-76)	72 (66-78)	74 (68-80)

The Mann-Whitney U-test indicated significant differences between the groups in the tests and the final exam ($p < 0.001$).

Observations of students' activity in class also showed significant differences between the groups (Table 3).

Table 3. Median Indicators of Activity in the Classroom (over the semester)

Indicator	Intrinsic motivation	Extrinsic motivation	U-test	p-value
Voluntary responses	18 (15-21)	10 (7-13)	412.5	< 0.001
Initiated questions	13 (10-15)	7 (5-9)	487.0	< 0.001
Participation in group discussions	16 (13-19)	8 (6-11)	453.5	< 0.001
Quality of comments (1-5)	4 (3-5)	3 (2-4)	528.0	< 0.01

Assessing the depth of understanding of the material, we once again found significant differences between the two groups. Specifically, students with intrinsic motivation demonstrated a deeper understanding.

Median assessment of the depth of understanding (1-10 point scale):

– Intrinsic motivation group: 8 (7-9),

– Extrinsic motivation group: 6 (5-7).

Mann-Whitney U-test: $U = 389.5$, $p < 0.001$

Our original questionnaire assessing students' satisfaction with learning detected a higher satisfaction level among intrinsically motivated students.

Median satisfaction level (1-5 point scale):

– Intrinsic motivation group: 4 (3-5),

– Extrinsic motivation group: 3 (2-4).

Mann-Whitney U-test: $U = 567.0$, $p < 0.01$

Analysis of the depth of students' understanding of the material showed significant differences between the groups with different types of motivation. Students motivated predominantly intrinsically scored higher across all aspects of the depth of understanding:

1. Application of language structures in unusual contexts: median score of 8 (7-9) for the intrinsically motivated group vs. 6 (5-7) for the extrinsically motivated group ($U = 412.5$, $p < 0.001$).
2. Analysis and interpretation of complex texts: median 7 (6-8) vs. 5 (4-6), respectively ($U = 389.0$, $p < 0.001$).
3. Critical thinking in working with English-language sources: median 7 (6-8) vs. 5 (4-6) ($U = 401.5$, $p < 0.001$).
4. Metalinguistic skills: median 8 (7-9) vs. 6 (5-7) ($U = 423.0$, $p < 0.001$).
5. Creative use of language: median 8 (7-9) vs. 5 (4-6) ($U = 378.5$, $p < 0.001$).

Correlation analysis with Spearman's rank correlation coefficient showed the following relationships between the studied factors (Table 4).

Table 4. Results of Correlation Analysis

Factor	Intrinsic motivation	Academic performance
Intrinsic motivation	-	0.65 ($p < 0.001$)
Activity in the classroom	0.69 ($p < 0.001$)	0.57 ($p < 0.001$)
Depth of understanding of the material	0.62 ($p < 0.001$)	0.68 ($p < 0.001$)
Satisfaction with learning	0.55 ($p < 0.001$)	0.51 ($p < 0.001$)

Analysis of changes in the level of motivation during the semester using the Friedman test demonstrated statistically significant changes in both groups:

– Intrinsic motivation group: $\chi^2(2) = 18.7$, $p < 0.001$,

– Extrinsic motivation group: $\chi^2(2) = 12.3$, $p < 0.01$.

Post-hoc analysis using the Wilcoxon criterion with Bonferroni correction suggests that in the intrinsically motivated group, the level of motivation increased significantly by mid-semester ($Z = -3.8$, $p < 0.001$) and remained elevated at the end of the semester compared to its start ($Z = -3.2$, $p < 0.01$). In contrast, the extrinsically motivated group showed a significant decrease in motivation by the end of the semester compared to its beginning ($Z = -2.9$, $p < 0.01$).

3.2. Results of Thematic Analysis of Teacher Interviews

The analysis of semi-structured interviews with teachers (n=10) pointed to several key themes. Most teachers (8 out of 10) noted more active participation in online classes on the part of students with high intrinsic motivation. Seven teachers reported greater quality assignments from these students. Almost all teachers (9 out of 10) pointed out that intrinsically motivated students more easily adapted to distance learning. All interviewees emphasized greater independence and initiative in looking up additional materials and completing optional tasks among students with intrinsic motivation. Finally, eight teachers highlighted that intrinsically motivated students demonstrated stable interest in learning over the semester, whereas the level of interest among extrinsically motivated learners declined with time (Table 5).

Table 5. Themes Identified in Teacher Interviews

Theme	Subtheme	Frequency (n = 10)	Illustrative Quote
Classroom Engagement	Active participation in discussions	8	Students with intrinsic motivation participate more actively and consistently in online discussions
Academic Performance	Higher quality of written assignments	7	Their essays are more analytical and demonstrate deeper understanding of the material
Adaptability to Distance Learning	Faster adjustment to online format	9	They adapt more easily to remote learning and handle technical challenges independently
Autonomy and Initiative	Independent search for additional materials	10	They often look for extra materials and complete optional tasks without being required
Motivation Dynamics	Stable interest throughout semester	8	Their motivation remains stable, while externally motivated students gradually lose engagement

Proceeding from the findings, we can draw the following conclusions regarding our research hypotheses:

H0 (Students' academic performance does not depend on the type of motivation) is rejected owing to statistically significant differences in academic performance between the two groups ($p < 0.001$).

H1 (Students with intrinsic motivation demonstrate better results) is accepted given the greater academic performance, activity, and depth of understanding in the intrinsically motivated group.

H2 (There is a significant connection between intrinsic motivation and other learning factors) is also accepted based on the results of correlation analysis, which shows significant positive correlations between intrinsic motivation and the studied parameters ($p < 0.001$ for all correlations).

Thus, our findings confirmed the important contribution of intrinsic motivation to the effectiveness of teaching English to students remotely.

4. Discussion

The results convincingly demonstrated the significant role of intrinsic motivation in the effectiveness of teaching English to philology students remotely. These conclusions agree with the theoretical provisions of Dörnyei and Ushioda (2021) on the pivotal role of motivation in foreign language learning and support the conclusions of Ryan and Deci (2020) about the advantages of intrinsic motivation over extrinsic motivation in educational settings.

The observed differences in academic achievement between groups with different types of motivation support the results obtained by Lamb et al. (2019). We agree that intrinsic motivation contributes to deeper and more sustained language learning. However, our study extends these findings by demonstrating that the benefits of intrinsic motivation persist in distance learning.

Our findings of greater engagement in class and deeper understanding of the material in intrinsically motivated students are consistent with the results of Guillén-Gámez et al. (2020). This emphasizes the importance of developing strategies to increase students' intrinsic motivation online.

Our findings on the dynamics of motivation during the semester partially diverge from the theoretical ideas of Besser et al. (2022). While Besser et al. hypothesize a general decrease in motivation during long-term distance learning, our results demonstrate that this parameter remains stable or even increases in students with strong intrinsic motivation. This may indicate that intrinsic motivation is an important factor in resilience to the challenges of distance learning.

The observed differences in the depth of understanding of the material between students with different types of motivation agree with the theory of deep and surface approaches to learning (Biggs, 1987; Marton, Säljö, 1976). According to our study, intrinsically motivated students tend to take a deeper approach to language learning, demonstrated by their ability to apply knowledge in unusual situations, critically analyze texts, and use language creatively. These findings expand the understanding of the role of motivation in foreign language learning, especially in the context of distance learning.

The discovered connection between intrinsic motivation and metalinguistic skills is thought-provoking. This may indicate that intrinsically motivated students are more inclined to reflect on the structure and features of the studied language, which is consistent with the research by Jessner (2006) on metalinguistic awareness in foreign language learning.

Our findings bring attention to the need for specific strategies to develop a depth of understanding in students with predominant extrinsic motivation. It may be worth considering methods to gradually transform extrinsic motivation into intrinsic, as suggested by Ryan and Deci (2020) as part of their Self-Determination Theory.

The results of interviews with teachers supplement and enrich the quantitative data, consistent with the methodological approach proposed by Huang et al. (2020). Teachers' observations of greater autonomy and initiative in intrinsically motivated students support the findings of Namaziandost et al. (2020) on the importance of autonomy in language learning.

5. Conclusion

The results have important practical implications. First, they emphasize the need to develop strategies to develop and support students' intrinsic motivation in the context of distance learning. Second, our findings testify to the value of an individualized approach to students with different types of motivation.

Our study meaningfully contributes to understanding the role of motivation in learning English remotely by providing empirical evidence that can be used to improve educational practices in the context of the digitalization of higher education.

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European Journal of Contemporary Education
E-ISSN 2305-6746
2026. 15(1): 164-179
DOI: 10.13187/ejced.2026.1.164
https://ejce.cherkasgu.press

Who Compensates? Examining the Social Support Hierarchy in English Learning for Yi Minority Students in China

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Abstract

In China's multi-ethnic regions, English education remains a significant challenge. For ethnic minority students like the Yi, social support networks are critical for academic achievement and buffering learning stress. While qualitative studies suggest a "compensatory support hierarchy" exists due to limited family-based cultural and linguistic capital, this model has not been quantitatively examined. This study aims to fill this empirical gap. Adopting a quantitative, single-case study design, this study surveyed junior high school students (N = 40) in Mabian Yi Autonomous County. Data were analyzed using descriptive statistics, paired-samples t-tests (with Cohen's d), and multiple linear regression. The findings reveal: (1) A significant support hierarchy exists, with Teacher Support (M = 4.38) rated significantly higher than Peer and Parent Support. (2) Multiple regression confirmed that Teacher Support was the only significant unique predictor for both higher English achievement (β = .384) and lower learning stress (β = -.403), while both Peer and Parent Support showed no significant predictive power. (3) Students with higher English achievement (p = .016) and lower stress levels (p = .030) perceived significantly more teacher support, suggesting a "Matthew Effect" driven by accumulative capital dynamics. This study concludes that in a context of limited family cultural and linguistic capital, the teacher acts as the primary institutional conduit for compensatory support serving as a key driver of, and buffer for, students' English learning.

Keywords: social support, English education, Yi minority, cultural capital, teacher support.

1. Introduction

The pursuit of English proficiency in China is intrinsically linked to opportunities for social mobility and global integration (Nguyen, Hajek, 2023). However, this pursuit is academically fraught for students in multilingual and multicultural contexts, particularly those from ethnic

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minority groups (Kim, 2026). These students must navigate a complex trilingual environment, often balancing their ethnic mother tongue (eg., Nuosu Yi), the national language (Mandarin), and a global language (English) simultaneously (Chen, Manosuthikit, 2025; Mouboua et al., 2024).

To understand how students access support in this high-stress context, we ground our investigation in Bourdieu's (1986) theory of capital. Specifically, we distinguish between three forms: social capital (networks of relationships), cultural capital (family educational background), and linguistic capital (proficiency in dominant languages like Mandarin and English). For students from rural ethnic minority backgrounds, these forms of capital are often limited. Lareau (2000) provided an early account of how family capital deficits shape educational outcomes, and recent studies confirm that low socioeconomic status still restricts rural Chinese students' access to English resources (Wu, Tarc, 2024). In particular, while parents in these contexts may offer emotional support, they often lack the specific cultural and linguistic capital – such as English proficiency or familiarity with academic norms – to provide the informational and instrumental support essential for academic success (Wu, Tarc, 2024; Echeverri-Sucerquia, 2010).

This capital deficit creates a potential support vacuum in the family domain. Yet, social support is a key mediator of academic outcomes, particularly for students navigating high-stress trilingual environments (Azpiazu et al., 2024; Wang, Eccles, 2012). A growing body of research confirms that both parental and school support contribute to academic achievement and learning resilience (Werang et al., 2025; Xiao et al., 2025), and familial support remains a crucial focus for minority and first-generation students globally (Cuevas, 2025). Students typically build support networks through parents, teachers, and peers (Malecki, Demaray, 2002), with each source serving distinct functions: parents offer emotional comfort and financial support (Wu, Tarc, 2024); teachers provide direct academic guidance (Sadoughi, Hejazi, 2023); and peers create collaborative spaces for language practice and shared empathy (Lopez, Estremera, 2025; Wang, Jokikokko, 2024). Given the capital constraints faced by parents in rural minority areas, and the fundamentally imbalanced support networks documented in such contexts (Li, Zhou, 2025), we hypothesize that a "compensatory support hierarchy" exists. In this hierarchy, school-based actors – teachers and peers – become the primary sources of academic support, superseding the role of the family in this specific domain.

Despite the plausibility of this hypothesis, two major empirical gaps remain. First, existing studies rarely examine Chinese ethnic minority groups such as the Yi. Yi trilingual learners may face unique structural capital deficits that are distinct from those of mainstream populations. Second, previous research on minority student support has largely relied on qualitative methods (e.g., Yang, Chen, 2026). While these studies suggest the existence of a support hierarchy, they have not quantitatively tested its structure or measured its statistical impact on academic outcomes.

This study aims to fill these gaps by quantitatively examining this hypothesized compensatory hierarchy. Focusing on Yi trilingual learners, we seek to isolate the unique predictive power of each support source (teacher, peer, parent) on two key academic outcomes: English achievement (measured by recent midterm exam scores) and English learning stress (self-reported). By disentangling the distinct roles of support sources and types, this research provides a rigorous empirical model of the social support network in an under-researched trilingual context. The findings are expected to offer education policy makers and practitioners clear, evidence-based targets for designing interventions to mitigate learning stress and improve English achievement for this vulnerable student population.

2. Literature Review

2.1. Social Support as a Critical Buffer in Multilingual Contexts: Sources and Types

Social support is a well-established factor influencing both academic success and emotional well-being, particularly within the high-stress, multilingual settings that ethnic minority students navigate (Azpiazu et al., 2024; Wang, Eccles, 2012). In these contexts, students often face a compounded cognitive load from managing multiple languages (e.g., L1, L2, and L3) alongside affective challenges, such as Foreign Language Learning Anxiety (FLLA) (Zhang, 2019; Chen, Chang, 2004; Sparks, Ganschow, 1993). A robust body of research demonstrates that perceived social support functions as a critical buffer against these unique, compounded stressors (Holt, Espelage, 2007). A supportive environment can directly mitigate learning anxiety (Wang et al., 2021; Song et al., 2022), and recent research confirms this strong link between social support, academic stress, and learning engagement among adolescents (Suwajo et al., 2024). Consequently,

strong support networks are consistently linked to higher school engagement (Wang, Eccles, 2012), better overall school adjustment (Azpiazu et al., 2024), and improved academic achievement (Wenz-Gross, Siperstein, 1997).

To operationalize the concept of social support, it is crucial to differentiate it along two primary dimensions: its source (the provider) and its type (the action) (Cleary, 2017; Tardy, 1985). The interplay between these dimensions determines the network's effectiveness. For adolescents, the social support network is primarily composed of three distinct sources: parents, teachers, and peers. These three groups represent the key actors within the student's microsystem (Bronfenbrenner, 1994), and validated instruments like the Child and Adolescent Social Support Scale (CASSS) are specifically designed to measure the perceived support from these three discrete sources (Malecki, Demaray, 2002).

These sources provide support across three widely recognized types. According to House (1981) and Tardy (1985), these support types are distinct, each serving a specific function. Emotional support involves expressions of empathy, care, trust, and nurturance, which build an individual's self-worth and resilience. In contrast, informational support operates on a cognitive level, providing the advice, guidance, constructive feedback, and knowledge that are useful for problem-solving. Finally, instrumental support refers to the provision of tangible aid, material resources, or direct services, such as financial assistance or time, to resolve a problem. Crucially, in any given socio-cultural context, these sources and types are not interchangeable. A key hypothesis of this study is that in the specific context of rural, trilingual China, a student's access to a specific type of support (e.g., informational) is structurally dependent on its source (e.g., teacher vs. parent). Understanding this structural composition is the first step toward modeling its impact.

2.2. The Hypothesized Support Hierarchy in a Trilingual, Minority Yi Context

The specific socio-cultural context of Yi students, a trilingual (Yi, Mandarin, English), rural, and often low-SES environment, provides a critical test case for social support theories. This context theoretically realigns the roles of each support source, creating a hypothesized hierarchy that this study aims to quantify.

In developmental psychology, parents are considered the foundational source of support, providing the primary emotional base that fosters resilience and academic motivation (Grolnick, Kurowski, 1999). However, Bourdieu's (1986) theory of capital provides a critical lens for understanding the limits of this support. While parents may provide high levels of emotional support, their ability to provide academic informational support (e.g., homework help, grammar advice) or instrumental support (e.g., affording extracurricular courses) is directly constrained by their own "cultural capital" (e.g., educational attainment, English proficiency) and "economic capital" (Echeverri-Sucerquia, 2010; Lareau, 2000). Recent research in China confirms this, finding that family-based cultural capital is a significant mediator of English proficiency, particularly for rural and lower-class students (Wu, Tarc, 2024). This leads to the hypothesis that parental support, while emotionally present, will have a non-significant predictive relationship with English-specific academic achievement.

A positive teacher-student relationship is a powerful predictor of L2 motivation and engagement (Henry, Thorsen, 2018; Karam, 2006), and a recent meta-analysis confirms that teacher support is a robust predictor of L2 learning motivation across studies (Sadoughi, Hejazi, 2023). In a context where parental academic support is structurally constrained, the teacher's role becomes amplified. The teacher transitions from being just an instructor to being the primary source of expert informational support (e.g., timely feedback, clear explanations) and a potential "cultural broker" who bridges the gap between the students' home life and the academic field (Chen, 2025; Bassey, 1996). Recent research from China powerfully demonstrates that a strong teacher-student relationship can actually moderate the negative link between low socioeconomic status and foreign language achievement (Ma et al., 2025). This suggests that for Yi students, the teacher is not just a source of support, but potentially the most critical source. This leads to the hypothesis that teacher support will be the strongest unique predictor of both English achievement and reduced learning stress.

The third source, the peer group, is essential for adolescent social and emotional well-being (Wentzel, 1998). In L2 learning, peer interaction provides vital, low-stakes opportunities for practice, socialization, and the collaborative negotiation of meaning (Wang, Jokikokko, 2024; Paradowski et al., 2021; Philp et al., 2013). Recent studies also highlight the role of peer social support in the context of collaborative L2 writing and feedback (Lopez, Estremera, 2025; Xu, Rahim, 2025). Positive peer interactions are directly linked to higher academic engagement and

motivation in L2 learning (Shao et al., 2024). Peers are an especially potent source of emotional support, as they share the same struggles and can provide unique encouragement. However, their capacity for informational support may be inconsistent; if the entire peer group lacks high proficiency, they may be unable to provide accurate academic guidance (Long, Porter, 1985). This leads to the hypothesis that peer support will be a strong predictor (especially for mitigating stress) but will be secondary to teacher support in its predictive power for academic achievement.

2.3. The Present Study

This literature review, framed by social support and capital theories, establishes a clear theoretical model of a compensatory support hierarchy. It posits that in the specific context of Yi trilingual learners – where parents often lack the cultural and linguistic capital to provide informational and instrumental support for English learning – the structural constraints on parental academic support elevate the role of teachers and peers as the primary providers of informational and instrumental support. This hierarchy, however, has not been quantitatively modeled or empirically validated.

Significant gaps remain in the literature. First, existing studies rarely examine Chinese ethnic minority groups such as the Yi, who may face unique structural capital deficits distinct from mainstream populations. Second, previous research on minority student support has largely relied on qualitative methods (e.g., Yang, Chen, 2026). While these studies suggest the existence of a support hierarchy, they have not quantitatively tested its structure or measured its statistical impact on academic outcomes. Consequently, we lack a clear, quantitative map of this support network, nor do we know the relative statistical weight or unique predictive power of each support source on key academic outcomes.

This study is designed to fill these gaps by empirically testing the compensatory support hierarchy. Based on the theoretical framework and literature review presented above, we propose the following research questions:

RQ1: What is the hierarchical structure of the social support network for Yi students learning English?

RQ1a: Are there significant differences in the support received from teachers, peers, and parents, and what is the magnitude of these differences?

RQ1b: Are there significant differences in the types of support received (emotional, informational, instrumental), and what is the magnitude of these differences?

RQ2: Controlling for other support sources, what is the unique predictive power of teacher, peer, and parental support on students' English achievement (measured by recent midterm exam scores) and learning stress (self-reported)?

RQ3: Do students with different levels of English achievement and learning stress perceive significantly different levels of support from their teachers?

Correspondingly, we propose three hypotheses:

H1 (Hierarchy): Students will perceive a clear hierarchy of support sources, with Teacher Support being rated significantly higher than Peer Support, and Peer Support being rated significantly higher than Parental Support.

H2 (Teacher's Predictive Power): Teacher Support will be more significant to predict academic outcomes. Specifically, Teacher Support will positively predict English scores and negatively predict Learning stress, even when controlling for parent and peer support.

H3 (Parent's Predictive Power): Parental Support will have less significant unique predictive power over English scores or Learning stress in the multiple regression models.

By examining these hypotheses, this study aims to provide an empirical model of the social support network for Yi trilingual learners. The significance of this research is twofold. Theoretically, it provides a rigorous test of social support and capital theories in an under-researched trilingual context by disentangling the distinct roles of support sources and types. Practically, by identifying who matters most and what type of support is most critical, this study is expected to offer education policymakers and practitioners clear, evidence-based targets for designing interventions to mitigate learning stress and improve English achievement for this vulnerable student population.

3. Methods

3.1. Research Design and Participants

This study employs a quantitative, single-case study design within a cross-sectional framework. The "case" is a single, intact classroom of Yi ethnic minority students, representing a

bounded system. This design was chosen over a large-scale survey because the primary goal is not to achieve broad statistical generalizability, but rather to provide a deep, holistic quantitative snapshot of the social support mechanisms and their relationship with academic outcomes within one specific, representative educational context (Yin, 2018). This approach allows for the testing of theoretical propositions in a real-world, under-researched setting.

The research was conducted at a junior secondary school in Mabian Yi Autonomous County, Sichuan Province, a representative Yi ethnic minority region in Southwest China. The sample (N = 40) represents one intact Grade 9 class. All students in the class voluntarily agreed to participate in the survey, resulting in a 100 % response rate for this specific case. This N = 40 sample thus constitutes a complete census of the chosen case, providing a robust dataset for analyzing the internal dynamics and shared perceptions of this specific social group.

3.2. Instruments and Measures

Data for perceived social support were collected using a quantitative survey instrument adapted from the well-validated Child and Adolescent Social Support Scale (CASSS; Malecki, Demaray, 2002). Aligned with the theoretical framework (Sources × Types), the instrument was divided into three sections measuring perceived support from Parents, English Teachers, and Peers. The items were adapted from the original CASSS and contextualized to the English learning environment. Following the (Types) framework, items measured Informational Support (e.g., "My English teacher often teaches us methods for memorizing words"), Emotional Support (e.g., "When I perform poorly, my English teacher will respect my feelings"), and Instrumental Support (e.g., "When I miss class, my classmates will share English notes with me"). All items were rated on a 5-point Likert scale (1 = "Completely Disagree" to 5 = "Strongly Agree").

A validity and reliability analysis were conducted on the adapted scales for the current sample (N = 40). All three subscales consisted of 12 items each. The internal consistency for each subscale was high: Parental Support (12 items, Cronbach's α = .820), Teacher Support (12 items, Cronbach's α = .894), and Peer Support (12 items, Cronbach's α = .867). Furthermore, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicated good construct validity for all scales (Parental: .733; Teacher: .742; Peer: .846).

Students' perceived learning stress was measured using a 13-item researcher-developed scale. The development of this instrument was theoretically informed by the foundational constructs of the original 33-item Foreign Language Classroom Anxiety Scale (FLCAS; Horwitz et al., 1986). Specifically, our items were designed to capture the core anxiety factors (e.g., communication apprehension, test anxiety) identified by Horwitz et al. (1986), while also adapting them to the specific socio-cultural and academic pressures of the Yi trilingual context. Our approach aligns with the development of more concise anxiety measures in the field, such as the 8-item Short-Form FLCAS (S-FLCAS), which was first extracted by MacIntyre (1992) and later validated and popularized by Dewaele and MacIntyre (2014) and Botes et al. (2022). The final 13-item scale covers multiple facets of stress, including affective responses (e.g., "I feel anxious about my English grades") and cognitive appraisals (e.g., "English is my weak subject"). All items were rated on a 5-point Likert scale (1 = "Completely Disagree" to 5 = "Strongly Agree"). The scale demonstrated a good reliability and validity in the current study (Cronbach's α = .856, KMO = .828).

English Achievement was measured using students' official school records. To ensure a stable and reliable measure of academic performance, the variable was calculated by taking the average of the students' scores from the three most recent unified school examinations. The total possible score for each examination was 100 points.

For the purposes of analysis, several composite variables were created. To address RQ1a (comparison by sources), three composite variables were created by calculating the mean score of all items pertaining to each source: Parent Support, Peer Support, and Teacher Support. To address RQ1b (comparison by types), three composite variables were created by calculating the mean score of all items pertaining to each type (across all three sources): Emotional Support, Informational Support, and Instrumental Support. For RQ2 (predictive power), the three source variables (Parent Support, Peer Support, Teacher Support) were used as predictors, with two outcome variables: English Achievement (midterm exam scores, out of 100) and Learning Stress (composite mean score from the 13-item scale, on a 5-point scale).

3.3. Data Analysis and Ethical Considerations

All valid data from the 40 participants were analyzed using SPSS 26.0. The analysis strategy was structured to directly answer the three research questions:

To answer RQ1 (Hierarchy): A series of Paired-Samples T-Tests was conducted to determine if the mean differences between the three support sources and three support types were statistically significant. Cohen's d is reported as the measure of effect size.

To answer RQ2 (Predictive Power): Two standard multiple linear regression models were conducted. This method was chosen to assess the unique predictive power of each support source while controlling for the others. Model 1 (Predicting Achievement): English Scores was entered as the dependent variable, with the three source variables entered simultaneously as predictors. Model 2 (Predicting Stress): Learning Stress was entered as the dependent variable, with the same three source variables entered as predictors. Given the sample size (N = 40), the statistical power for these regression models is limited. Therefore, these models are considered exploratory. The analysis will focus cautiously on the magnitude and direction of the standardized beta coefficients (β) and the overall model fit (R^2), alongside statistical significance, to identify theoretically meaningful patterns.

To answer RQ3 (Group Differences): The sample was split by the median for English Scores (Median = 35.5) and Learning Stress (Median = 3.58). Independent-Samples T-Tests were performed to compare the mean Teacher Support scores between these groups. Cohen's d is reported. The significance level was set at .05 for all inferential tests.

This study was conducted in accordance with all ethical guidelines for research involving human participants. Approval was obtained from the school administration. Prior to data collection, written informed consent was obtained from the guardians of all students, and assent was obtained from the students themselves. Participants were explicitly informed that their participation was completely voluntary, anonymous, and that they could withdraw at any time without any negative consequences. All students in the class chose to participate. To ensure anonymity, the survey data was numericized, and no personally identifiable information (such as names) was collected. All data was stored securely on an encrypted hard drive accessible only to the research team.

4. Results

This section presents the quantitative findings, structured to answer the three research questions in order. First, Table 1 provides the comprehensive descriptive statistics for all core variables.

A preliminary review of the Outcomes variables in Table 1 indicates that the sample (N = 40) represents a population facing significant academic challenges. The mean English Score was 35.53 (out of 100, SD = 8.87), and the mean Learning Stress was 3.51 (SD = 0.91), a level notably above the scale's neutral midpoint.

For the primary variables of interest, the descriptive statistics in Table 1 reveal a clear hierarchy, which is visually represented in the radar charts in Figure 1. For Support Sources, Figure 1 clearly illustrates that Teacher Support (M = 4.38, SD = 0.81) was perceived as the strongest source. This was followed by Peer Support (M = 3.28, SD = 0.94), with Parent Support (M = 2.52, SD = 0.87) receiving the lowest mean rating. For Support Types, the hierarchy was less pronounced but still distinct. Emotional Support (M = 3.56, SD = 0.69) was the most perceived type, followed by Informational Support (M = 3.39, SD = 0.92) and Instrumental Support (M = 3.22, SD = 0.88).

Table 1. Descriptive Statistics of Core Variables (N = 40)

Variable	Mean (M)	Std. Dev. (SD)	Min	Max
Support Sources				
Teacher Support	4.38	0.81	2.50	5.25
Peer Support	3.28	0.94	1.33	5.25
Parent Support	2.52	0.87	1.17	4.17
Support Types				
Emotional Support	3.56	0.69	2.08	4.83
Informational Support	3.39	0.92	1.50	5.08
Instrumental Support	3.22	0.88	1.00	4.92
Outcomes				
English Scores	35.53	8.87	18.00	55.00
Learning Stress	3.51	0.91	1.50	5.33

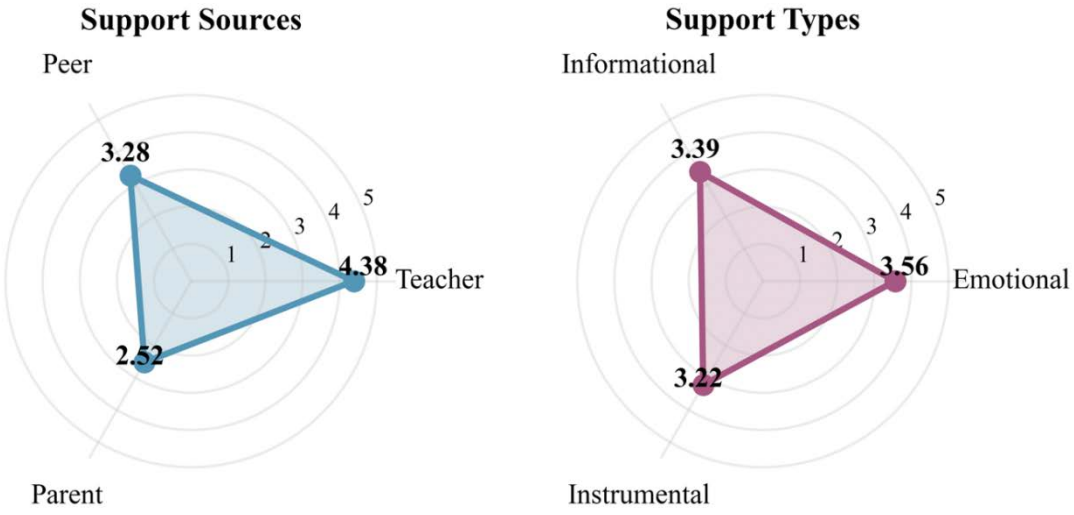

Fig. 1. Social Support Profiles

4.1. The Hierarchy of the Social Support Network

To answer the first research question (RQ1), which addressed the hierarchical structure of the support network, a series of paired-samples t-tests was conducted.

First, to address RQ1a (Support Sources), the mean scores of the three support sources were compared. The results, presented in Table 2, reveal a clear, statistically significant, and robust hierarchy. Perceived Teacher Support (M = 4.38) was rated significantly higher than both Peer Support (M = 3.28; t (39) = 5.67, p < .001) and Parent Support (M = 2.52; t (39) = 9.47, p < .001). Furthermore, Peer Support was also rated significantly higher than Parent Support (t (39) = 3.96, p < .001). The effect sizes (Cohen's d) for these differences were all substantial, ranging from medium (d = 0.63) to very large (d = 1.49), confirming a clear hierarchy: Teacher Support > Peer Support > Parent Support.

Table 2. Paired-Samples T-Test Results for Support Sources (N = 40)

Comparison Pair	Mean Diff.	t-value (df = 39)	p-value (2-tailed)	Effect Size (Cohen's d)
Teacher vs. Parent	1.86	9.47	< .001***	1.49 (Very Large)
Teacher vs. Peer	1.10	5.67	< .001***	0.89 (Large)
Peer vs. Parent	0.76	3.96	< .001***	0.63 (Medium)

Notes: ***p < .001

Second, to address RQ1b (Support Types), a comparison of the three support types revealed a different and more nuanced pattern, as shown in Table 3. Emotional Support (M = 3.56) was perceived significantly more than Instrumental Support (M = 3.22; t (39) =2.45, p = .019), with a small-to-medium effect size (d = 0.43). However, no other differences were statistically significant. The differences between Emotional and Informational support (p = .301) and between Informational and Instrumental support (p = .246) were not significant. This indicates that students in this sample perceived Emotional and Informational support at similarly high levels.

Table 3. Paired-Samples T-Test Results for Support Types (N= 40)

Comparison Pair	Mean Diff.	t-value (df = 39)	p-value (2-tailed)	Effect Size (Cohen's d)
Emotional vs. Instrumental	0.34	2.45	.019*	0.43 (Small-Medium)

Comparison Pair	Mean Diff.	t-value (df = 39)	p-value (2-tailed)	Effect Size (Cohen's d)
Emotional vs. Informational	0.17	1.05	.301	0.21 (Small)
Informational vs. Instrumental	0.17	1.18	.246	0.19 (Small)

Notes: * p < .05.

4.2. Unique Predictive Power on Student Outcomes

To address RQ2 – which investigated the unique predictive power of each support source on achievement and stress – a two-step analysis was conducted.

As a preliminary step, a Pearson Correlation analysis was run as a preliminary step. The results, presented in Table 4, provided initial evidence of the relationships. Teacher Support was the only source significantly correlated with both outcomes, showing a moderate positive correlation with English Scores (r (38) = .390, p < .05) and a moderate negative correlation with Learning Stress (r (38) = -.410, p < .01). Importantly, the correlations between the three predictor variables (Teacher, Peer, and Parent support) were all low (r < .30), indicating that multicollinearity was not a concern for the subsequent regression analysis (see also Figure 2).

Table 4. Pearson Correlation Matrix with 95 % Confidence Intervals (N = 40)

Variable	1	2	3	4	5
1. Teacher Support	–				
2. Peer Support	.280 [-.06, .57]	–			
3. Parent Support	.230 [-.11, .53]	.250 [-.09, .54]	–		
4. English Scores	.390* [.09, .62]	.140 [-.18, .44]	-.040 [-.35, .28]	–	
5. Learning Stress	-.410** [-.64, -.11]	-.190 [-.48, .12]	-.010 [-.32, .30]	-.210 [-.50, .10]	–

Notes: 95 % Confidence Intervals shown in brackets below each correlation coefficient.
*p < .05, *p < .01.

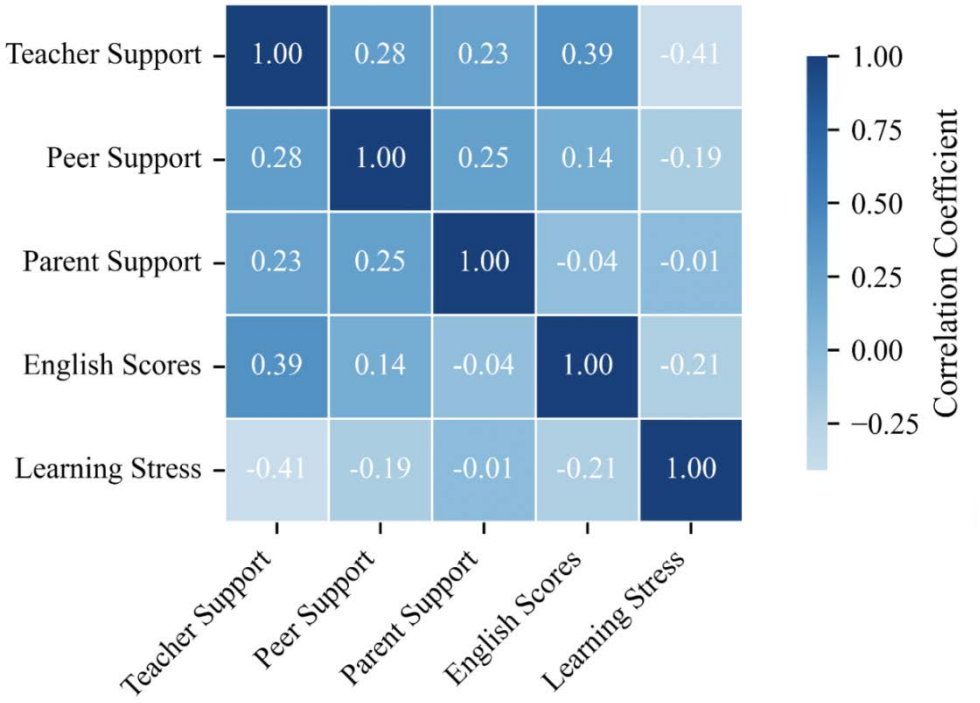

Fig. 2. Correlation Matrix of Study Variables.

Following this preliminary analysis, two standard multiple regression models were conducted to assess the unique predictive power of each support source while controlling for the others. The results are presented in Table 5.

Table 5. Multiple Regression Results Predicting Student Outcomes (N = 40)

Predictor	**Model 1: English Scores**			**Model 2: Learning Stress**		
	Std. Beta (β)	t-value	p-value	Std. Beta (β)	t-value	p-value
Teacher Support	**.384**	**2.53**	**.016***	**-.403**	**-2.67**	**.011***
Peer Support	.028	0.18	.855	-.104	-0.68	.499
Parent Support	-.135	-0.89	.381	.059	0.39	.700
Model Fit	R^2 = .18 F (3, 36) = 2.65 p = .063			R^2 = .19 F (3, 36) = 2.76 p = .056		

Notes: Significant predictors (*p < .05) are shown in bold.

For Model 1 (Predicting English Scores): While the overall model did not reach statistical significance (F (3, 36) = 2.65, p = .063, R^2 = .18), the individual predictor analysis strongly supported this study's hypothesis. As predicted, Teacher Support was the only significant positive predictor (β = .384, t = 2.53, p = .016). Peer Support (β = .028) and Parent Support (β = -.135) were not significant predictors.

For Model 2 (Predicting Learning Stress): Similarly, the overall model for Learning Stress approached but did not reach statistical significance (F (3, 36) = 2.76, p = .056, R^2 = .19). However, as hypothesized, Teacher Support again emerged as the only significant unique predictor (β = -.403, t = -2.67, p = .011). Peer Support (β = -.104) and Parent Support (β = .059) were not significant.

These key findings are visualized in Figure 3, which clearly illustrates that Teacher Support was the only predictor to have a statistically significant effect on both outcomes.

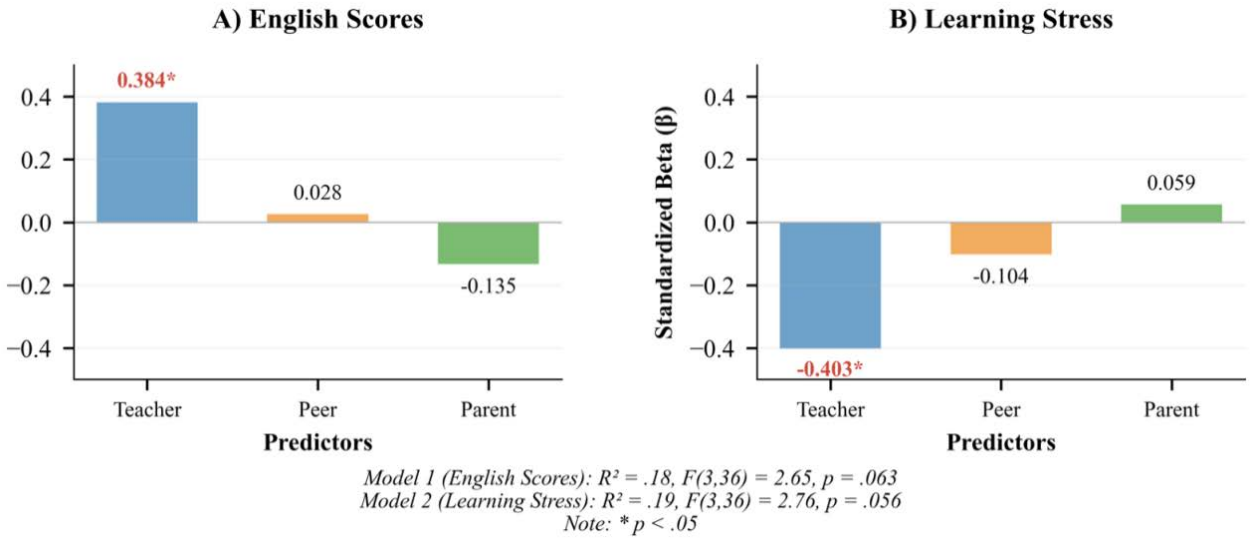

Fig. 3. Multiple Regression Analysis: Predicting Students Outcomes

4.3. Group Differences in Teacher Support

The third research question (RQ3) explored whether students with different outcome levels perceived different levels of teacher support. To investigate this, the sample was split by the median for both English Scores and Learning Stress, and independent-samples t-tests were conducted. The results are presented in Table 6 and visualized in Figure 4.

Table 6. Independent-Samples T-Test Results for Teacher Support by Group

Group Comparison	N	Mean	t-value (df = 38)	p-value (2-tailed)	Effect Size (Cohen's d)
By English Scores					
High-Score Group	20	4.72	2.53	.016	0.82 (Large)
Low-Score Group	20	4.04			
By Learning Stress					
High-Stress Group	20	4.08	-2.25	.030	-0.73 (Medium)
Low-Stress Group	20	4.68			

Notes: * p < .05.

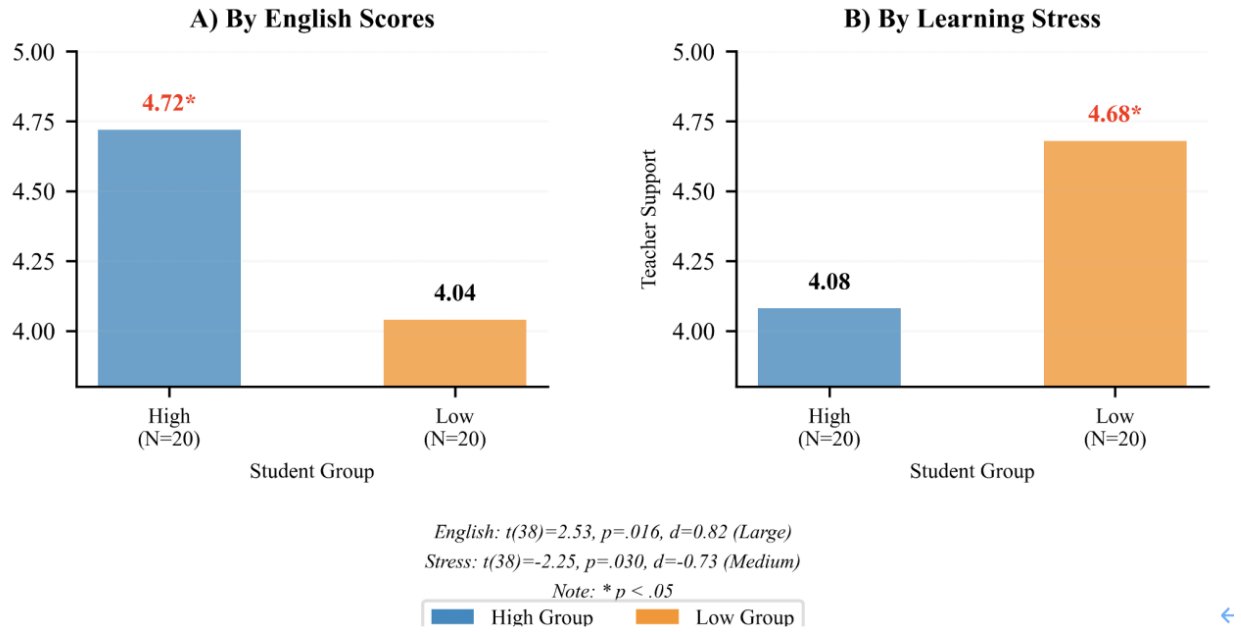

Fig. 4. Teacher Support: Group Comparisons

As shown in Figure 4A, a significant difference was found between the High-Score and Low-Score groups. The High-Score group (N = 20, M = 4.72) perceived significantly more teacher support than the Low-Score group (N = 20, M = 4.04). This difference was statistically significant (t (38) = 2.53, p = .016) and represented a large effect size (Cohen's d = 0.82).

A significant difference was also found based on stress levels, as illustrated in Figure 4B. The Low-Stress group (N = 20, M = 4.68) perceived significantly more teacher support than the High-Stress group (N = 20, M = 4.08). This difference was statistically significant (t (38) = -2.25, p = .030) and represented a medium effect size (Cohen's d = -0.73). In summary, the results indicate that students who were already performing better (higher scores) and feeling better (lower stress) perceived significantly higher levels of support from their teachers.

5. Discussion

The quantitative results of this study provide strong empirical validation for our central theoretical framework – the compensatory support hierarchy. The findings not only map the structure of this hierarchy but also, through regression modeling, confirm the causal mechanisms hypothesized in our literature review. The discussion is organized around our three research questions, interpreting the findings in dialogue with the established literature on social support and cultural capital.

5.1. The Hierarchy of Support: Quantitative Evidence for the Capital Deficit

The first set of findings provided a clear, quantitative map of the support network, confirming our first hypothesis (H1). The perceived hierarchy of support was unequivocally T-P-P

(Teacher > Peer > Parent), with the low mean score for Parent Support (M = 2.52) being statistically and practically significant.

This finding does not imply a lack of parental love. Rather, it provides powerful empirical evidence for the "structural absence" of academic support theorized by Bourdieu (1986) and Lareau (2000). Critically, this absence is not monolithic; it reflects a specific constellation of capital deficits. Parents in this context lack the cultural capital – such as educational attainment and familiarity with academic norms – to provide effective informational support (e.g., homework guidance). More fundamentally, they lack the linguistic capital – proficiency in English, the target language – to assist with language-specific tasks. This dual deficit in cultural and linguistic capital renders them unable to serve as effective academic resources, despite their emotional availability. Our data quantitatively confirms what recent qualitative studies in similar Chinese contexts have suggested: in the specific, high-capital domain of English learning, rural and lower-class parents are structurally constrained from providing effective informational or instrumental support (Wu, Tarc, 2024). This finding gives statistical weight to the "capital deficit" model documented in other minority contexts (Echeverri-Sucerquia, 2010).

In stark contrast, Teacher Support emerged as the dominant perceived source (M = 4.38). This finding provides strong validation for our compensatory hypothesis. In a context where the family microsystem (Bronfenbrenner, 1994) is constrained, students are not left in a vacuum; they actively and successfully turn to the school. This aligns perfectly with the literature positioning the teacher as a "cultural broker" (Bassey, 1996; Chen, 2025), serving as the students' primary access point to the specific cultural and linguistic capital required for English proficiency.

Finally, the analysis of support types (RQ1b) adds crucial depth. The finding that Informational Support (M = 3.39) was perceived as highly as Emotional Support (M = 3.56) is critical. It confirms that students are not merely seeking affective comfort; they are actively seeking the specific strategic guidance (e.g., advice, feedback) that our capital-based framework predicted would be lacking at home. This preference for informational support underscores the students' recognition that the cultural and linguistic capital they need for academic success must come from institutional sources rather than from their families.

5.2. The Teacher's Unique Predictive Power: Confirming the Compensatory Pillar

The multiple regression analysis provides the most robust evidence for our model, offering clear support for hypotheses H2 and H3.

As hypothesized (H3), even after controlling for other sources, Parental Support showed no unique predictive power for either English achievement or learning stress. This finding reinforces the capital deficit argument: while parental emotional support is present and may contribute to general well-being (Grolnick, Kurowski, 1999), it does not translate into a statistically significant impact on these specific, high-stakes academic outcomes. This pattern diverges from studies in more resource-rich contexts where parental support has been found to significantly predict academic outcomes (Xiao et al., 2025; Werang et al., 2025). The discrepancy suggests that the predictive power of parental support is contingent on the availability of cultural and linguistic capital, a condition that is not met in this rural, trilingual context. The absence of predictive power reflects the structural reality that cultural capital and linguistic capital, not emotional availability, are the key resources required for improving English achievement and mitigating learning stress.

Conversely, and in full support of H2, Teacher Support was the only significant predictor for both higher English Scores (β = .384, p = .016) and lower Learning Stress (β = -.403, p = .011). This confirms the teacher's "dual function" as both an academic driver (informational/instrumental) and an affective buffer (emotional). This finding provides strong, localized evidence for the mechanisms identified in broader L2 motivation studies (Henry, Thorsen, 2018; Sadoughi, Hejazi, 2023) and, most importantly, aligns with recent Chinese-context research demonstrating that strong teacher-student relationships can moderate the negative link between low socioeconomic status and foreign language achievement (Ma et al., 2025).

From a capital theory perspective, the teacher's unique predictive power can be understood as a form of capital compensation. Where parents lack the cultural and linguistic capital necessary for English learning, the teacher steps in as the primary source of these capital forms. The teacher provides linguistic capital through explicit language instruction, corrective feedback, and modeling of academic discourse. Simultaneously, the teacher transmits cultural capital by socializing students into the norms, expectations, and strategies of academic success – knowledge that is often unavailable within the family microsystem. In this sense, the teacher functions not merely as an

instructor but as an institutional conduit for the very forms of capital that students require to succeed but cannot access at home.

A notable and unexpected finding related to our hypothesis on peer support. We hypothesized it would be a secondary predictor, but in the regression model, peer support had no unique predictive power for either outcome. This contradicts some literature that finds a strong link between peers and engagement (Shao et al., 2024). However, it does not mean peers are unimportant. This finding likely refines our understanding of the hierarchy:

Informational Inconsistency: As theorized (Long, Porter, 1985), peers in this low-proficiency context may be unable to provide accurate informational support, thus having no effect on achievement. This reflects a collective deficit in linguistic capital among peers, limiting their capacity to serve as reliable sources of academic guidance.

Statistical Eclipsing: The teacher's role as the sole institutional and expert provider of support may be so overwhelmingly powerful in this compensatory model that it statistically "eclipses" the more informal, affective support provided by peers.

5.3. A "Matthew Effect": A Critical Complication of the Compensatory Framework

Our third research question (RQ3) was designed to test the limits of this compensatory model, and its findings add a crucial layer of complexity that, at first glance, seems to contradict the very idea of "compensation". We found that students who were already doing well (High-Score group) and feeling less stressed (Low-Stress group) perceived significantly more teacher support.

This presents a paradox: How can support be "compensatory" if it flows disproportionately to the students who need it least? This paradox can be resolved by examining the accumulative logic of capital (Bourdieu, 1986). Capital – whether cultural, linguistic, or social – tends to accumulate in ways that advantage those who already possess it. In this context, students who enter school with even small amounts of cultural capital (e.g., educated parents, exposure to print materials) or linguistic capital (e.g., early exposure to Mandarin or English) are more likely to be perceived by teachers as "teachable" or "motivated." This perception triggers a positive feedback loop: these students receive more teacher attention, which further enhances their capital, leading to higher achievement and lower stress. Conversely, students who lack these initial capital endowments are more easily overlooked, receiving less teacher support and falling further behind. Thus, while the structure of compensation (the teacher as a resource) exists universally, its distribution is governed by capital-based sorting mechanisms. This finding provides quantitative evidence for a "Matthew Effect" in education, as famously applied to language learning by Lamb (2011). In his qualitative study of a similar developing context (Indonesia), Lamb (2011) identified "positive and negative feedback loops" that widen the gap between high and low achievers over time.

The Positive Loop (Our High-Achievers): Lamb (2011, p. 15) describes how students with small early advantages (often from family "cultural capital") are noticed by the teacher, are more stimulated, develop an identity as a "good learner", and actively seek more interaction. Our quantitative data provides a snapshot of this: our high-achievers are those already in this positive loop, perceiving (and likely receiving) more support.

The Negative Loop (Our Low-Achievers): Conversely, Lamb (2011, p. 16) shows how low-achievers are often identified as "slow", sit at the back, are easily distracted, and develop an identity as a "poor learner". Our data – showing that low-achievers perceive less support – is the statistical signature of this tragic negative cycle.

Therefore, our finding does not invalidate the compensatory framework; it refines it with a critical warning. It suggests that while the institution (the school) provides a compensatory structure (the teacher), the practice of that compensation is not automatic. It is subject to a Matthew Effect, where a student's existing (even small) advantages and their "habitus" (Bourdieu, 1986) dictate their ability to successfully access that compensatory support. In other words, while the school provides the potential for capital compensation, the actual distribution of that compensation is mediated by students' pre-existing capital endowments and their capacity to activate teacher investment. This dynamic aligns with recent conceptualizations of minority family stress, which emphasize how structural inequalities shape the distribution of resources within educational settings (Li, Zhou, 2025).

5.4. Implications for Policy and Practice

The findings of this study – particularly the confirmation of the teacher as the sole predictive pillar and the complicating "Matthew Effect" – have profound and immediate implications for educational policy in similar minority and low-SES contexts.

First, the finding that parents lack the specific cultural and linguistic capital needed for academic support implies that interventions focused on "fixing" parents (e.g., asking them to help with English homework) are misplaced and likely ineffective. Policy should instead adopt an asset-based approach, valuing parents' emotional support while redirecting academic resources elsewhere. Recognizing the limits of family-based capital, resources should be strategically allocated to the institution that can effectively compensate for these deficits – the school. This aligns with the emphasis on structural rather than individual-level interventions found in recent scholarship on minority student support (Cuevas, 2025).

Second, our data is unequivocal: the teacher is the system. They are the only effective agent for both driving achievement and buffering stress. From a capital perspective, the teacher serves as the primary conduit for both cultural and linguistic capital in this context. Therefore, any policy or funding aimed at improving outcomes for these students must be directed at strengthening this specific pillar.

Finally, the "Matthew Effect" finding (RQ3) is a stark warning. It is not enough to simply have a supportive teacher in the building. If that support is only successfully accessed by high-achievers, the school is failing in its compensatory mission. The capital-based sorting mechanisms identified in this study demand a proactive intervention.This implies an urgent need for professional development that moves beyond standard pedagogy and equips teachers with proactive, culturally responsive strategies to identify and engage the low-achieving, high-stress students who need their support the most but are least likely to seek it (Antony-Newman, 2025). Drawing on Cuevas's (2025) work on familial support for first-generation students, teacher training should also cultivate an understanding of the diverse capital resources students bring from their home environments, enabling educators to build bridges rather than assume deficits. Teachers would benefit from training that helps them recognize and disrupt the capital-based feedback loops that perpetuate inequality, ensuring that compensatory support reaches those who need it most.

6. Conclusion

This study set out to examine a hypothesized "compensatory support hierarchy" for ethnic minority Yi students in a trilingual English learning context. The findings provide strong, empirical validation for this model. We confirmed a distinct hierarchy in which Teacher Support is perceived as the dominant source, significantly superseding Peer and Parent Support. This result provides clear, statistical validation for the "structural absence" of parental academic support predicted by Bourdieu's (1986) theory of cultural capital. Critically, this absence reflects not a lack of parental care, but a dual deficit in cultural capital (e.g., educational attainment, familiarity with academic norms) and linguistic capital (e.g., English proficiency), which together constrain parents' ability to provide the informational and instrumental support essential for academic success.

The study's main contribution lies in its regression models, which confirm the function of this hierarchy. We found that Teacher Support was the sole significant and unique predictor for both higher English achievement and lower learning stress, supporting our hypothesis (H2) that the teacher functions as the primary compensatory pillar. From a capital perspective, this finding positions the teacher as the key institutional conduit for the cultural and linguistic capital that students require but cannot access at home. However, this compensatory framework is complicated by the discovery of a "Matthew Effect", which revealed that this critical teacher support is disproportionately perceived by students who are already high-achieving. This finding suggests that while the structure of compensation exists universally, its actual distribution is governed by accumulative capital dynamics – students with initial advantages are better positioned to activate and benefit from teacher support, while those most in need risk being overlooked.

The conclusions of this study must be considered in light of three main limitations. First, the "quantitative case study" design (N = 40) provides a deep snapshot but is not statistically generalizable, necessitating replication with larger, multi-site samples to test the consistency of the findings. Second, the cross-sectional nature of the data prevents claims of causality. A longitudinal study is required to explore the likely bi-directional relationship between teacher support and achievement. Finally, the non-significant finding for peer support in the regression model is a provocative area for future inquiry. This may be due to the overpowering statistical weight of teacher support in this context, and future mixed-methods research is needed to delve deeper into

the specific mechanisms of peer interaction and to clarify under what conditions peer support becomes educationally consequential.

Despite these limitations, this study provides a rigorous, empirically grounded test of social support and capital theories in an under-researched trilingual context, demonstrating how cultural, linguistic, and social capital intersect to shape academic outcomes. By identifying the teacher as the critical compensatory pillar and revealing the capital-based sorting mechanisms that perpetuate inequality, the findings offer policymakers and educators clear, evidence-based targets for intervention. Ensuring that compensatory support reaches the students who need it most will require strengthening the teacher's role while equipping educators with strategies to recognize and disrupt the feedback loops that systematically disadvantage low-achieving, high-stress learners.

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