

Enhancing students' speaking skills through mind mapping tools

Aissulu K. Kaldarova^{1,*,†}, Marco A. Vasquez^{1,†}, Nazym B. Baisbay^{1,†}, Saule Amanzholova^{2,†} and Gulshat B. Baispay^{3,†}

¹International Information Technology University, 34/1 Manas St., Almaty, 050040, Kazakhstan

²Astana IT University, Astana, Kazakhstan

³Al-Farabi Kazakh National University, 71 Al-Farabi Avenue, Almaty, 050040, Kazakhstan

Abstract

This study investigates the impact of mind mapping tools on enhancing intermediate level speaking skills for IELTS preparation among students at the International Information Technology University. Utilizing a quantitative research approach, the study examines how visual organization tools can improve speaking skills of the learners. The research also discusses the significance of educational technology in language acquisition in a larger framework. Numerous studies have shown the advantages of technology integration in education, which has become an increasing trend. The research involved four groups, each comprising 15 students, with two experimental groups using mind mapping tools and two control groups following traditional methods over a fifteen-week period. Data were collected from pre- and post-intervention tests. Results reveal significant improvements in the experimental groups' speaking performance. The findings suggest that mind mapping is an effective strategy for structuring thoughts and enhancing verbal expression, leading to improved speaking outcomes. Visual organizing tools like mind mapping facilitate greater understanding, enhance recall, and assist structure knowledge. This study contributes to the growing body of evidence supporting innovative educational technologies in language learning and highlights the potential of mind mapping as a valuable tool for IELTS speaking preparation.

Keywords

English language, teaching, skills, speaking, technology, mind mapping, brainstorming

1. Introduction

Speaking skills are a crucial component of language proficiency, particularly in the context of standardized tests such as the International English Language Testing System (IELTS). For intermediate-level students, enhancing speaking abilities can significantly influence their overall performance and open doors to academic and professional opportunities. This study focuses on the use of mind mapping platforms as a tool to improve intermediate level speaking skills for IELTS preparation among students at the International Information Technology University (IITU).

The importance of speaking skills in IELTS cannot be overstated. The speaking section of the IELTS exam assesses candidates on their ability to communicate effectively in English, which includes fluency and coherence, lexical resource, grammatical range and accuracy, and pronunciation [1]. As globalization continues to expand, the ability to speak English fluently has become an essential skill for academic and professional success [2]. Therefore, developing effective strategies to enhance speaking skills is of paramount importance.

DTESI 2024: 9th International Conference on Digital Technologies in Education, Science and Industry, October 16–17, 2024, Almaty, Kazakhstan

* Corresponding author.

† These authors contributed equally.

✉ a.kaldarova@iitu.edu.kz (A. Kaldarova); m-a.vasquez@iitu.edu.kz (M. Vasquez); n.baisbay@iitu.edu.kz (N. Baisbay); s.amanzholova@astanait.edu.kz (S. Amanzholova); gulshat.bgb2@gmail.com (G. Baispay)

ORCID 0000-0002-7128-5731 (A. Kaldarova); 0000-0003-2609-3009 (M. Vasquez); 0009-0003-7227-9848 (N. Baisbay); 0000-0002-6779-9393 (S. Amanzholova); 0000-0003-4292-2938 (G. Baispay)



© 2023 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

One such strategy is the use of mind mapping platforms, which has gained traction in recent years due to its potential to facilitate cognitive processes and enhance learning outcomes [3]. Mind mapping, a visual organization tool, helps in structuring information, promoting better understanding, and improving recall. Previous studies have demonstrated the effectiveness of mind mapping in various educational contexts. Researcher Al-Jarf, for instance, found that mind mapping significantly improved students' writing performance by helping them organize their ideas coherently [4]. Similarly, Nesbit and Adesope conducted a meta-analysis that highlighted the positive impact of concept mapping on students' academic achievement [5].

Despite the growing body of research on mind mapping, there is a paucity of studies specifically examining its impact on speaking skills, particularly in the context of IELTS preparation. This gap is aimed to be filled by this research, which investigates the effectiveness of mind mapping platforms in enhancing intermediate level speaking skills among IITU students. The novelty of this study lies in its focus on speaking skills, which are often underrepresented in mind mapping research, and its application to IELTS preparation, a high-stakes language proficiency test.

The integration of technology in education has revolutionized teaching and learning practices, offering innovative solutions to traditional challenges. Mind mapping platforms, such as MindMeister and MindMup, provide digital environments where users can create and share mind maps easily. These platforms offer various features that can enhance the learning experience, such as collaborative tools, multimedia integration, and real-time updates. The potential of mind mapping platforms to improve speaking skills, a crucial yet challenging aspect of language learning, is explored by this study by leveraging these technological advancements.

The theoretical framework for this study is grounded in cognitive load theory and constructivist learning theory. Cognitive load theory suggests that learning is more effective when the cognitive load is optimized, allowing learners to focus on processing information rather than extraneous elements [6]. Mind mapping helps reduce cognitive load by visually organizing information, making it easier for learners to process and retain [7]. Constructivist learning theory posits that learners construct knowledge through active engagement and meaningful experiences [8]. Mind mapping aligns with this theory by encouraging students to actively organize and connect ideas, thereby facilitating deeper learning [9].

To assess the impact of mind mapping platforms on speaking skills, this study employs a quantitative data. Participants were divided into control and experimental groups, with the latter using mind mapping platforms over a ten-week period. Data were collected from pre- and post-intervention tests, surveys, and interviews. The pre- and post-intervention tests measured improvements in speaking skills.

The findings of this study have significant implications for language educators and learners. A valuable resource for educators seeking innovative strategies to improve language proficiency is provided by this research, by demonstrating the effectiveness of mind mapping platforms in enhancing speaking skills. Additionally, the study contributes to the growing body of evidence supporting the use of educational technologies in language learning, highlighting the potential of mind mapping as a valuable tool for IELTS preparation.

Previous research has highlighted the importance of effective speaking strategies in language learning. For example, Thornbury emphasized the need for learners to develop strategic competence, which includes the ability to organize and express ideas clearly [10]. This emphasis on strategic competence is aligned with by mind mapping, which helps students visually organize their thoughts. Additionally, Boonkit found that the use of speaking strategies significantly improved learners' confidence and performance in speaking tasks [11]. This study builds on these findings by exploring the specific impact of mind mapping platforms on speaking skills, providing a novel contribution to the field.

The study also addresses the broader context of educational technology and its role in language learning. The integration of technology in education has been a growing trend, with numerous

studies highlighting its benefits. Researcher Stockwell, for instance found that mobile learning technologies significantly enhanced language learning outcomes by providing flexible and interactive learning environments [12]. Similarly, Chapelle emphasized the potential of computer-assisted language learning (CALL) to offer personalized and adaptive learning experiences [13]. This study extends this line of research by examining the use of mind mapping platforms, a relatively underexplored area, in the context of language learning.

This study aims to investigate the impact of mind mapping platforms on enhancing intermediate level speaking skills for IELTS preparation among IITU students. A comprehensive analysis of the effectiveness of mind mapping in language learning is provided by the research. The findings are expected to contribute to the growing body of evidence supporting the use of educational technologies and offer valuable insights for educators and learners seeking innovative strategies to improve speaking skills.

2. Literature review

The development of effective speaking skills is critical for language learners, particularly those preparing for high-stakes tests like the IELTS. This literature review explores the role of mind mapping in enhancing speaking skills, examining various studies that highlight the potential benefits and limitations of this visual organization tool in language learning contexts.

2.1. Mind mapping in education

Mind mapping, introduced by Buzan and Buzan, is a visual tool that organizes information hierarchically and shows relationships among pieces of the whole. It has been widely adopted in educational settings due to its ability to enhance cognitive processes such as comprehension, memory, and creativity. Buzan and Buzan argue that mind mapping aligns with the brain's natural way of processing information, making it an effective method for learning and organizing thoughts [3].

Numerous studies have demonstrated the positive impact of mind mapping on learning outcomes. For instance, Al-Jarf found that using mind mapping software significantly improved the writing performance of freshman students by helping them organize their ideas coherently [4]. The study indicated that students who used mind maps produced more structured and detailed essays compared to those who did not use the tool. Similarly, Nesbit and Adesope conducted a meta-analysis that revealed the beneficial effects of concept mapping on students' academic achievement across various subjects. Their findings showed that students who used concept maps scored higher on assessments compared to those who did not, highlighting the tool's efficacy in enhancing understanding and retention of information [5].

2.2. Mind mapping and language learning

In the context of language learning, mind mapping has been used to improve various language skills, including reading, writing, and speaking. Thornbury emphasizes the importance of strategic competence in language learning, which includes the ability to organize and express ideas clearly. Mind mapping facilitates this by providing a visual framework that helps learners organize their thoughts and ideas systematically.

Several studies have explored the use of mind mapping in language learning. For example, in terms of writing, Al-Jarf's study mentioned earlier highlights the benefits of mind mapping in organizing ideas for essay writing. The visual nature of mind maps helps students see the connections between their ideas, leading to more coherent and well-structured essays. This is particularly useful for language learners who may struggle with organizing their thoughts in a new language [4].

2.3. Mind mapping and speaking skills

Despite the extensive research on the use of mind mapping in reading and writing, there is limited literature specifically addressing its impact on speaking skills. This gap in research is notable, given the importance of speaking skills in language proficiency and the unique challenges they present to learners. Speaking requires real-time processing of information and the ability to organize and articulate thoughts coherently, making it a complex skill to master.

Boonkit explored various strategies to enhance speaking skills among EFL learners and found that using visual aids, including mind maps, significantly improved learners' confidence and performance in speaking tasks [11]. The study revealed that visual aids helped students organize their ideas and provided a reference point during speaking tasks, reducing anxiety and improving fluency. This suggests that mind mapping, as a visual organization tool, has the potential to enhance speaking skills by helping learners structure their thoughts more effectively.

2.4. Cognitive theories supporting mind mapping

The theoretical framework for understanding the benefits of mind mapping in language learning can be grounded in cognitive load theory and constructivist learning theory. Cognitive load theory posits that learning is more effective when the cognitive load is optimized, allowing learners to focus on essential information rather than extraneous details. Mind mapping helps reduce cognitive load by visually organizing information, making it easier for learners to process and retain. Information is presented in a visual format by mind maps, helping learners see the relationships between ideas and reducing the cognitive effort required to understand complex information.

Constructivist learning theory, on the other hand, posits that learners construct knowledge through active engagement and meaningful experiences. Piaget argues that learners build their understanding through interactions with their environment and the active organization of information [8]. Mind mapping aligns with this theory by encouraging learners to actively organize and connect ideas, facilitating deeper learning and understanding. A more comprehensive understanding of the subject matter can be developed by learners, by engaging with the material in a meaningful way.

2.5. Mind mapping platforms and technological integration

With the advent of technology, mind mapping has evolved from a paper-based tool to digital platforms that offer enhanced functionalities. Mind mapping platforms like MindMeister, XMind, and Coggle provide digital environments where users can create, share, and collaborate on mind maps easily. These platforms offer features such as multimedia integration, real-time updates, and collaborative tools that can enhance the learning experience.

Stockwell highlights the benefits of mobile-assisted language learning technologies, emphasizing their potential to provide flexible and interactive learning environments [12]. Similarly, Chapelle underscores the advantages of computer-assisted language learning (CALL), which offers personalized and adaptive learning experiences. Mind mapping platforms integrate these technological advancements, providing learners with tools that can support their language learning process [13].

2.6. Studies on mind mapping platforms

Several studies have explored the use of digital mind mapping platforms in educational contexts. For instance, D'Antoni et al. investigated the use of digital mind mapping software in medical education and found that it improved students' understanding of complex medical concepts [14]. The study revealed that students who used digital mind maps performed better on assessments and reported a higher level of satisfaction with the learning process.

To sum up, it should be pointed out that different teaching tech tools are used in teaching and learning processes these days. Every country's development goals have been altered by the global COVID-19 pandemic. Governments were instead forced to cope with a never-ending stream of new problems in industry, healthcare, education, and economics. Digitalization has therefore been introduced more quickly in these fields. As a result, a growing number of individuals have begun utilizing electronic services, which has enhanced their level of digital literacy. Society has benefited from this aspect, which has also contributed to the development of new means of communication between the public and governments, as well as between academic institutions, businesses, and consumers [15].

Furthermore, it is highlighted that in the future the best education will be a hybrid of traditional classroom instruction and cutting-edge technological aspects, with students participating in the educational process to differing degrees [16].

2.7. Implications for IELTS preparation

The findings from these studies have significant implications for IELTS preparation, particularly in enhancing speaking skills. The IELTS speaking test assesses candidates on their ability to communicate effectively in English, focusing on fluency and coherence, lexical resource, grammatical range and accuracy, and pronunciation [1]. Mind mapping can help learners improve in these areas by providing a structured way to organize and articulate their thoughts.

Thornbury emphasizes the importance of developing strategic competence in language learning, which includes the ability to organize and express ideas clearly [10]. Mind mapping facilitates this by helping learners visually organize their ideas and see the connections between them. This can lead to more coherent and structured responses during the speaking test.

Moreover, Boonkit found that using visual aids, including mind maps, helped learners reduce anxiety and improve fluency [11]. This is particularly relevant for IELTS candidates, who often experience anxiety during the speaking test. Learners can be helped to stay focused and organized, leading to more confident and fluent speaking performance, by mind maps providing a visual reference.

The literature highlights the potential benefits of mind mapping in enhancing various language skills, including reading, writing, and speaking. While there is extensive research on the use of mind mapping in reading and writing, there is a notable gap in studies specifically examining its impact on speaking skills. This study aims to address this gap by investigating the effectiveness of mind mapping platforms in enhancing intermediate level speaking skills for IELTS preparation among IITU students.

The theoretical frameworks of cognitive load theory and constructivist learning theory provide a foundation for understanding the benefits of mind mapping in language learning. Mind mapping can help learners organize and retain information more effectively by reducing cognitive load and promoting active engagement. The integration of technology in education has further enhanced the potential of mind mapping platforms, offering digital tools that provide flexible and interactive learning environments. Studies on digital mind mapping platforms have shown positive outcomes in various educational contexts, suggesting their potential for enhancing language learning.

The findings of this study are expected to contribute to the growing body of evidence supporting the use of educational technologies in language learning. This research demonstrates the effectiveness of mind mapping platforms in enhancing speaking skills, providing valuable insights for educators and learners seeking innovative strategies to improve language proficiency.

3. Materials and methods of the research

During the spring semester of academic year 2023-2024, four groups of 1st year students from STEM (Information System/IS) streams enrolled in LAN6002/2A Foreign Language/IELTS Intermediate. The

syllabus covered “Social sphere of communication: Family in modern society; Socio-cultural sphere of communication: Recreation; Educational and professional field of communication: My Profession” modules which were offered to the students. A sample of 60 undergraduate students (IELTS Intermediate 1&2 experimental groups, IELTS Intermediate 3&4-control groups) worked with those topics starting from January 22, 2024, till May 11, 2024. The participants were randomly assigned to either the experimental groups, which engaged in mind mapping activities, or the control groups, which received traditional instructional methods.

Students in the experimental group were assigned to brainstorm on a variety of topics, including "Is it worth balancing work and study?; Money is a major source of motivation in the workplace; Experience or education: which matters more? (Figure 1). Various mind mapping platforms, including MindMeister, MindMup and others, were used in the brainstorming activities. This task had to be completed by each student on their own.

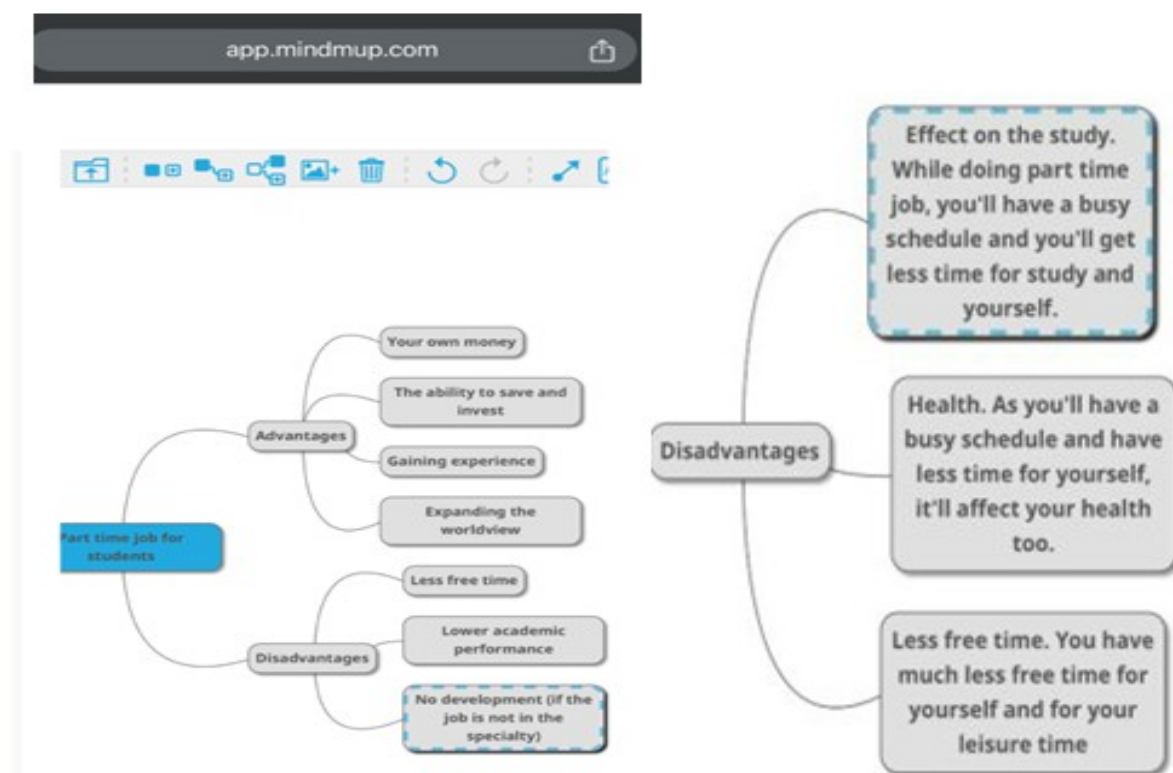


Figure 1: Mind mapping activities on topic “Is it worth balancing work and study”.

The speaking topics from the course were addressed in the mind mapping exercises. Prior to speaking about the assigned themes, the experimental group students were required to engage in brainstorming exercises and use the internet platforms. Students then delivered their two-minute speeches after working with the mind maps. The following criteria were included in the evaluation parameters: fluency and coherence; grammatical range and accuracy; lexical resource; pronunciation. The criteria were also pointed out in the syllabus and discussed in the first week of studying.

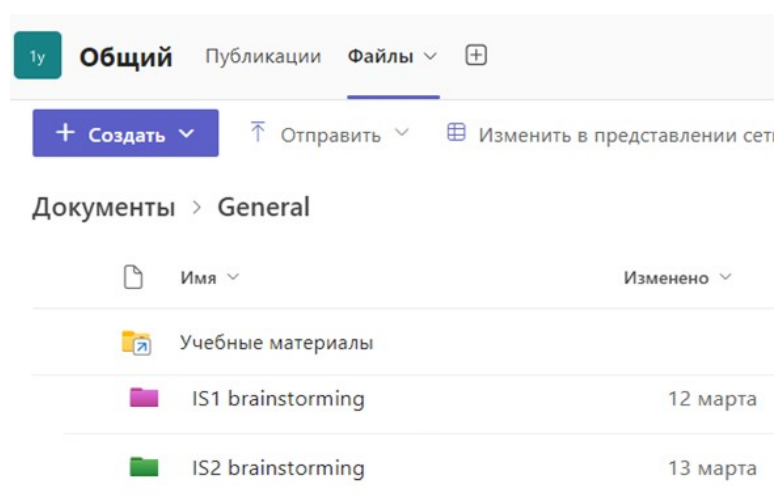


Figure 2: Materials on MT.

The mind maps created by each student were posted to the IITU Microsoft Teams (MT) platform. Additional resources and the syllabus were also published on MT (Figure 2).

There were twice-weekly IELTS Intermediate lessons for the experimental and control groups. In week #1, the students received a pre-test consisting of a speaking assignment. In week #2, the students in the experimental group began working with mind mapping exercises when they had their speaking tasks. In week #15, the students received a post-test. Measuring any improvements in speaking abilities using mind mapping activities was the main aim of this research.

4. Results and its discussion

This study examined how IITU students might improve their intermediate level speaking abilities in order to better prepare for the IELTS. The study looked at how visual organization tools can enhance speaking skills. The research had 60 undergraduate participants, of which 80 percent were men and 20 percent were women. The individuals in the study ranged in age from 17 to 18.

This section of the study focused on four International Information Technology University (IITU) Intermediate English language classes that were enrolled for the second semester of the academic year 2023–2024. Four groups totaling fifteen students each participated in the study: two experimental groups (IELTS Intermediate 1&2) used mind mapping platforms, while the other two control groups (IELTS Intermediate 3&4) used conventional techniques during the course of 15 weeks. Test results from both before and after the intervention were gathered (Figure 3).

Figure 3 shows that students in the experimental groups had more proficient speaking abilities than students in the control groups. This is evident from the percentage that participants received. The following is the mean score of the speaking test taken by the students during the pre- and post-tests.

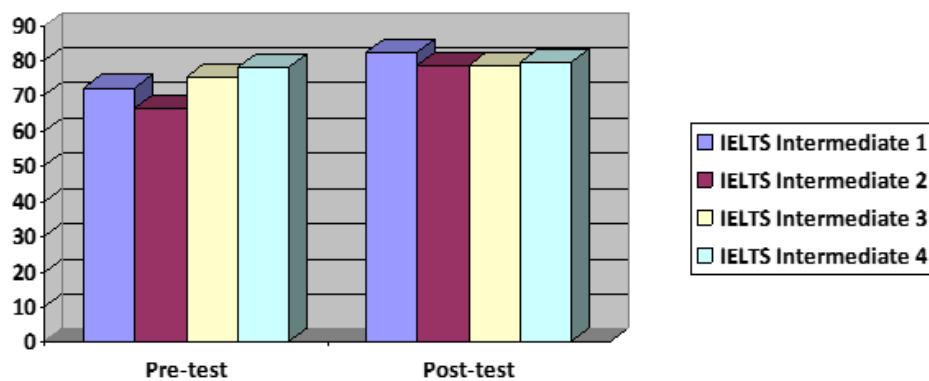


Figure 3: Results of pre/posttests (Mean score of the speaking tests).

In the first week of study, the experimental (IELTS Intermediate 1) group's mean score was 72,3%, and on the post-tests it was 82,4% with an improvement of 10,1%. Students in the IELTS Intermediate 2 experimental group scored 66.3% on the pre-test and 78.4% on the post-test, the difference of both tests was 12,1%. The control (IELTS Intermediate 3) group's mean score was 75.3% on the pre-test and 78.4% on the post-test with an improvement of 3,1%. Students in the control group (IELTS Intermediate 4) scored 78.2% on the pre-test and 79.4% on the post-test, the difference of both tests was 1,2%.

We would like to point out that IELTS Intermediate 2 group students scored the highest, while IELTS Intermediate 4 group students scored the lowest results. The findings show that students who utilized mind mapping platforms significantly improved their speaking abilities.

5. Conclusion

This study investigated the impact of mind mapping platforms on enhancing intermediate level speaking skills for IELTS preparation among students at the International IT University (IITU). Utilizing a quantitative research approach, it focused on how visual organization tools can improve speaking skills of the learners. The results indicate significant improvements in the speaking performance of students who used mind mapping platforms. These findings underscore the potential of mind mapping as an effective strategy for structuring thoughts and enhancing verbal expression, thereby contributing to the growing body of evidence supporting innovative educational technologies in language learning. The study highlights the importance of incorporating visual aids in language education to help students organize their ideas and improve their speaking skills, especially in preparation for high-stakes exams like the IELTS.

5.1. Limitations

Despite its significant findings, this study has several limitations. First, the sample size was relatively small, with only 60 students divided into four groups. A larger sample size might provide more generalizable results. Second, the study was conducted over a fifteen-week period, which may not be sufficient to observe long-term effects of using mind mapping on speaking skills. Future research could extend the duration to evaluate the sustained impact of mind mapping. Third, the study focused exclusively on intermediate-level students at IITU, limiting the generalizability of the findings to other proficiency levels or educational contexts. Additionally, the study relied on quantitative data from pre- and post-intervention tests, which may not capture the full range of students' experiences and improvements.

5.2. Recommendations

Based on the findings and limitations of this study, several recommendations can be made for future research and educational practice:

1. **Expand Sample Size and Diversity:** Future research should include a larger and more diverse sample of students from different proficiency levels and educational contexts to enhance the generalizability of the findings. This could provide a more comprehensive understanding of the effectiveness of mind mapping across various learner populations.
2. **Extend Study Duration:** Longer study durations are recommended to evaluate the long-term effects of mind mapping on speaking skills. This would help determine whether the observed improvements are sustained over time and provide insights into the continuous use of mind mapping as a learning tool.
3. **Incorporate Qualitative Methods:** Including qualitative methods such as interviews, focus groups, and observational studies could provide a deeper understanding of how students use mind maps and their perceptions of its benefits. This could complement the quantitative data and offer richer insights into the learning process.
4. **Training for Educators:** Educators should receive training on how to effectively integrate mind mapping into their teaching practices. This could include workshops, instructional materials, and ongoing support to ensure that teachers are equipped to help students maximize the benefits of mind mapping.
5. **Technology Integration:** Schools and universities should consider integrating digital mind mapping platforms into their language learning curricula. Providing access to these tools and training students on how to use them can enhance their learning experience and improve their speaking skills.
6. **Broader Application:** Future research could explore the application of mind mapping beyond speaking skills to other language skills such as reading, writing, and listening. This would provide a holistic view of its impact on language learning and inform comprehensive instructional strategies.

Mind mapping platforms offer a promising approach to enhancing speaking skills for IELTS preparation. The potential of this innovative educational tool can be further explored, and more effective language learning practices can be contributed to by future research, by addressing the limitations and building on the recommendations provided.

Declaration on Generative AI

The authors have not employed any Generative AI tools.

References

- [1] IELTS Scores Guide. Available at: — URL: <https://s3.eu-west-2.amazonaws.com/ielts-web-static/production/Guides/ielts-scores-guide.pdf> (accessed: 7.06.2024).
- [2] Crystal, D. (2003) *English as a Global Language* (2nd ed.). Cambridge University Press. 212 p.
- [3] Buzan, T., Buzan, B. (2010) *The Mind Map Book: Unlock Your Creativity, Boost Your Memory, Change Your Life*. BBC Active. 217 p.
- [4] Al-Jarf, R. (2009) Enhancing Freshman Students' Writing Skills with a Mind Mapping Software. Paper presented at the 5th International Scientific Conference, eLearning and Software for Education, Bucharest, April 2009.
- [5] Nesbit, J. C., Adesope, O. O. (2006) Learning with Concept and Knowledge Maps: A Meta-Analysis. *Review of Educational Research*. №76(3). P. 413-448. doi:10.3102/00346543076003413.

- [6] Sweller, J. (1988) Cognitive load during problem solving: Effects on learning. *Cognitive Science*. №12(2). P. 257-285. doi:10.1207/s15516709cog1202_4.
- [7] Mayer, R. E. (2009) *Multimedia Learning* (2nd ed.). Cambridge University Press. 320 p.
- [8] Piaget, J. (1952) *The Origins of Intelligence in Children*. International Universities Press. 419 p.
- [9] Jonassen, D. H. (1991) Objectivism versus constructivism: Do we need a new philosophical paradigm? *Educational Technology Research and Development*. №39. P. 5–14.
- [10] Thornbury, S. (2007) *How to Teach Speaking*. Pearson Longman. 160 p.
- [11] Boonkit, K. (2010) Enhancing the Development of Speaking Skills for Non-Native Speakers of English. *Procedia - Social and Behavioral Sciences*. №2(2). P. 1305-1309. doi:10.1016/j.sbspro.2010.03.191.
- [12] Stockwell, G. (2013) Mobile-assisted language learning. In M. Thomas, H. Reinders, & M. Warschauer (Eds.). *Contemporary Computer-Assisted Language Learning*. P. 201-216.
- [13] Chapelle, C. A. (2003) *English Language Learning and Technology: Lectures on Applied Linguistics in the Age of Information and Communication Technology*. John Benjamins Publishing. 228 p.
- [14] D'Antoni, A. V., Zipp, G. P., Olson, V. G., Cahill, T. F. (2010) Does the mind map learning strategy facilitate information retrieval and critical thinking in medical students? *BMC Medical Education*. №61. doi:10.1186/1472-6920-10-61.
- [15] Gubsky D, Daineko Y, Ipalakova M, Kleschenkov A, Tsoy D. Computer model of a spectrum analyzer for a virtual laboratory: development and introduction to the educational process. *PeerJ Comput Sci*. 2022 Nov 3;8:e1130. doi: 10.7717/peerj-cs.1130. PMID: 36426242; PMCID: PMC9680885.
- [16] Kaldarova, A., Kulgildinova, T., Berdenova, S., Zakirova, G., & Zhanabayeva, S. (2024). Subject-related communicative language competence: Exploring future information technology specialists' learning and teaching. *Journal of Education and E-Learning Research*, 11(1), 26–35. <https://doi.org/10.20448/jeelr.v11i1.5288>.