RETHINKING INTERPRETER TRAINING: THE ROLE OF MICROLEARNING IN BOOSTING KNOWLEDGE RETENTION

Hicham BOUGHABA *King Fahd School of Translation, Tangier, Morocco*

Abstract

This study examines the effectiveness of microlearning interventions in enhancing knowledge retention and interpreting performance among trainee interpreters. A quasi-experimental design was employed, with interpreting students divided into two groups: an experimental group receiving targeted microlearning modules on specialized terminology and a control group relying on general knowledge only. Their performance was evaluated according to four criteria: accuracy, clarity and fluency, terminology usage, and cultural and contextual understanding. Results indicate that participants who were exposed to microlearning modules achieved significantly higher scores across all evaluation criteria, with notable gains in accuracy and terminology usage. These findings suggest that microlearning constitutes a viable pedagogical strategy for interpreter training, offering accessible, targeted knowledge delivery that may enhance preparation and performance in specialized interpreting contexts.

Keywords: Microlearning – Interpreter training – Knowledge retention – Specialized terminology – Pedagogical innovation

INTRODUCTION

Interpreter training is a learning process that combines multiple skills. The American Translators Association explains that interpreters must work in various settings: courtrooms, international conferences, television programs, and media briefings, with United Nations meetings seen as the most representative example of the profession. Preparing students for these settings requires more than just language skills; it also involves developing advanced abilities in both source and target languages, gaining specialized knowledge, and mastering terminology resources and interpreting tools. These skills are essential for ensuring accuracy and effectiveness in professional interpreting tasks.

Traditional training programs have often relied on prolonged learning periods and thorough exploration of broad subject areas. However, the rapidly changing environment of professional interpreting requires innovative teaching methods that can improve knowledge retention while addressing the practical limitations encountered by both instructors and learners. The rise of microlearning as an educational innovation presents a hopeful solution to these issues by providing targeted, accessible learning modules aimed at specific skills crucial for understanding performance. Although there is an increasing interest in microlearning in diverse educational settings, there is little empirical research that explores its use in interpreter training programs. This gap is especially important considering the unique requirements of interpreting work, where professionals need to quickly utilize specialized terms and cultural insights during live performance scenarios. This study addresses this research gap by examining whether targeted microlearning interventions can enhance knowledge retention and interpreting performance among trainee interpreters working with specialized subjects.

1. LITERATURE REVIEW

The theoretical basis of microlearning as an educational approach draws on several fields, including cognitive psychology, neuroscience, learning theory, and educational technology. Research in these areas helps explain the principles that underpin microlearning and its effectiveness across a range of educational settings. As Theo Hug (2005) notes, microlearning “refers to relatively small learning units and short-term learning activities,” a definition that is closely tied to theories of attention, memory, and information processing in both cognitive and educational research.

1.1. Defining Microlearning and Its Core Characteristics

Microlearning can be viewed as an approach built around very short learning units, often lasting no more than five minutes, that are accessible on demand and target a single concept. As Jomah *et al*. (2016) argue, it is “one of the most suitable methods for contemporary learning systems.” A key advantage of this approach lies in its capacity to help learners quickly locate the exact

information they need. Instead of offering content in large blocks, microlearning presents information in brief, targeted units, often through informal formats that still facilitate effective learning.

Several studies point to common structural characteristics of microlearning. For example, Leong *et al*. (2021) reviewed 476 publications published between 2006 and 2019 and documented a forty-seven-fold increase in research on microlearning during this period. This rise was considerably greater than that observed in the wider areas of e-learning and general learning research, suggesting that microlearning has become an increasingly prominent focus, particularly in professional training and higher education. Their findings also point to a close relationship between microlearning and mobile learning environments. In a similar vein, Gassler *et al*. (2005) describe microlearning as being organized into short, self-contained units that can be accessed flexibly and on demand. They further note that these units are often delivered through digital platforms, allowing learners to engage with content in brief, focused sessions that can be easily integrated into everyday activities.

1.2. Cognitive and Neurological Foundations

The effectiveness of microlearning can be understood in relation to established principles in cognitive psychology and neuroscience. Drawing on a neuroscientific perspective, Shail (2019) identifies several mechanisms through which this approach supports knowledge retention. Particularly, microlearning appears to mitigate the effects of the Ebbinghaus Forgetting Curve, which entails a model proposed by the German psychologist Hermann Ebbinghaus (1885/1913) describing how newly acquired information is rapidly forgotten over time unless actively reinforced, by promoting spaced repetition and the periodic reactivation of information, both of which contribute to memory consolidation and the transfer of information into long-term storage. This consolidation process involves protein synthesis and structural changes at the neuronal level that help stabilize memory over time.

In interpreting studies, similar concerns about cognitive limitations have been addressed by Daniel Gile (2009), whose Effort Model explains how interpreting performance depends on the allocation of limited cognitive resources across listening, memory, and production efforts. From this perspective, any pedagogical approach that reduces cognitive overload, such as microlearning, can support more efficient processing and improved performance.

These observations are consistent with findings in cognitive science, where spaced learning has been shown to enhance long-term retention (Cepeda *et al*., 2006). The short and focused nature of microlearning units may reduce cognitive fatigue, which has been linked to neurotransmitter depletion and reduced cognitive efficiency. By keeping cognitive demands within manageable limits, microlearning helps sustain the neurochemical balance associated with attention and learning performance.

Further support for this cognitive account is provided by Park and Kim (2018), who note that learning in smaller content units is supported by research in learning psychology and short-term memory. They argue that breaking complex courses into manageable, smaller lessons preserves the neurotransmitter cascade for steady neurochemical performance. This process can accelerate learning, as it helps students avoid mental fatigue. From a neurological perspective, this helps explain why shorter, focused learning sessions may be more effective than longer, traditional forms of instruction for certain objectives.

1.3. Empirical Evidence of Effectiveness

Empirical studies across multiple educational contexts have demonstrated the effectiveness of microlearning interventions. Sirwan Mohammed *et al*. (2018) conducted a quasi-experimental study in primary school ICT education. They compared microlearning methods with traditional teacher-centered approaches. The microlearning group achieved an average passing rate of eighteen percent higher than the traditional learning group, with zero failing students compared to failures across all subjects in the traditional group. 51% of students in the microlearning group achieved excellent grades compared to only 11% in the traditional group. Student feedback indicated a markedly positive reception of microlearning tools, with interactive activities, concise tutorial videos, and flashcards emerging as the most preferred instructional approaches.

In the context of higher education, Nikou and Economides (2018) examined the use of mobile-based microlearning and assessment for homework in science education. Their study employed a two-group pretest–post-test experimental design.

The results showed that the experimental group achieved significantly higher gains in factual knowledge compared to the control group. In addition, students using mobile-based microlearning reported higher levels of perceived autonomy, competence, and relatedness after the intervention, along with greater overall learning satisfaction. These findings suggest that microlearning can support not only cognitive development but also key motivational factors that contribute to sustained engagement in learning.

Enachescu (2024) carried out a mixed-methods study on the effects of microlearning on skill acquisition and learning-to-learn competencies in Romanian higher education. The study used a quasi-experimental design with 63 undergraduate students. The findings from this study showed that students exposed to microlearning made substantially greater progress in skill acquisition than those in traditional lecture-based settings, with a large effect size. The intervention also led to notable improvements in metacognitive regulation.

Further analysis indicated that changes in metacognitive regulation explained 28% of the variation in skill acquisition gains. These results suggest that

microlearning supports not only immediate learning outcomes but also the development of self-regulatory skills that are important for long-term learning.

1.4. Microlearning in Professional Training

The use of microlearning in health professions education offers useful parallels for interpreter training, as both domains involve combining specialized knowledge with practical performance skills. Chang De Gagne *et al*. (2019) conducted a scoping review of microlearning in this field, examining 17 studies published between 2011 and 2018. All of the studies focused on short learning sessions of less than 15 minutes. When evaluated through the Kirkpatrick model, 94% of the studies reported positive learner reactions, while 82% showed evidence of knowledge or skill acquisition. A smaller proportion (29%) identified observable changes in learner behavior. As the authors note, "microlearning has the potential to improve performance and possibly enhance patient safety," highlighting its practical value in applied training contexts.

In general, these findings suggest that microlearning can support both performance improvement and learning retention. Its structure also aligns with cognitive load theory, as breaking content into smaller units allows learners to process and consolidate information more effectively over time.

In a similar vein, Zarshenas *et al*. (2022) examined the impact of microlearning on nursing students' learning outcomes and self-efficacy through an interventional study. Using a quasi-experimental design, the authors compared an intervention group that received microlearning content via the WhatsApp platform with a control group that followed a traditional training approach.

The results from this study showed a statistically significant difference in clinical learning scores between the two groups, with the microlearning intervention producing better outcomes. In addition, self-efficacy scores in the intervention group increased significantly after the training, whereas no meaningful change was observed in the control group.

This result is particularly relevant for interpreter training as self-efficacy plays a central role in managing the cognitive load and performance pressure associated with real-time interpreting, suggesting that microlearning may contribute not only to skill development but also to greater learner confidence.

1.5. Integrated Microlearning and Technology-Enhanced Delivery

The integration of microlearning with learning management systems and mobile technologies represents a significant development in making this pedagogical approach scalable and sustainable. Díaz Redondo *et al.* (2021) proposed a technical architecture for integrating microlearning content into traditional Learning Management Systems using Service-Oriented Architecture and established e-learning standards. Their survey of 58 lecturers from Spain and Western Balkan countries revealed that 83% agreed that microlearning is a good supplement to face-to-face learning, and over

70% believed it could improve student engagement and knowledge retention. The proposed hybrid approach combines the structured, formal environment of a Learning Management System with the engaging, flexible, and concise nature of micro-content.

From a different perspective, Gassler *et al.* (2004) introduced the concept of *Integrated Micro Learning*, which builds on the idea of using everyday technologies to deliver short, interactive learning activities. Instead of requiring dedicated study time, their approach embeds learning into tools that users already engage with on a regular basis. To test this idea, they developed a prototype that integrated microlearning into a computer screensaver. The system offered short learning tasks during brief moments of waiting, making use of time that would otherwise be fruitless.

Initial user feedback indicated a high level of acceptance. Learners chose to engage with the content in about 75% of cases and completed an average of 15 microlearning units per day. This contrasts sharply with traditional e-learning systems, which often report dropout rates exceeding 75%. These results suggest that microlearning can be effectively incorporated into daily routines, allowing learners to engage with content without setting aside additional, dedicated time for study.

1.6. Microlearning and Knowledge Retention

The connection between microlearning and knowledge retention is a recurring theme in the literature. Several studies point to its role in improving how knowledge is acquired and maintained over time. For example, Job and Ogalo (2012) explored microlearning as a strategy for knowledge development. Their findings showed that 79% of respondents believed microlearning changes the way knowledge is acquired, while 90% agreed that it is effective in delivering work-related knowledge.

The study also highlighted the importance of process and curriculum design in strengthening knowledge acquisition. Activities such as mind-mapping and text editing were identified as particularly useful in supporting knowledge transformation. These results point to the value of microlearning in organizational learning and knowledge management. These findings are particularly pertinent to interpreter training programs, where the efficient transfer of knowledge is a key concern.

From a training design perspective, Dolasinski and Reynolds (2020) proposed a four-phase microlearning model tailored to training in the hospitality sector. Their work focuses on how microlearning can respond to common constraints in workplace training, such as limited time, scarce resources, and changing learner expectations. This model draws on established learning theories, including Gagné's Conditions of Learning and Expansive Learning Theory. Dolasinski and Reynolds (2020) argue that microlearning is particularly effective for developing practical, skill-based competencies, as its structure aligns well with how cognitive skills are processed and acquired.

Another important aspect of the model is its focus on measuring behavioural change and providing practice opportunities. These elements make it especially relevant for fields such as interpreter training, where performance and skill application are central.

1.7. Synthesis and Implications for Interpreter Training

The body of research reviewed points to microlearning as a well-founded and widely tested pedagogical approach, applicable across a range of educational settings. Across studies, there is consistent evidence of its benefits, particularly in improving knowledge retention and increasing learner engagement. The literature also shows that microlearning supports metacognitive development and works well with mobile and digital technologies. These features make it especially adaptable to contemporary learning environments.
In the context of interpreter training, these advantages are particularly relevant. Interpreting requires the rapid recall of specialized terminology and context-specific knowledge, often under strict time constraints. This aligns closely with the strengths of microlearning highlighted in the research.

However, the literature also reveals a significant gap. Despite extensive research on microlearning in educational technology, health professions education, corporate training, and general higher education, limited empirical investigation has specifically examined its application within interpreter training programs. This gap is notable given the unique demands of interpreting, which combines linguistic proficiency, specialized subject knowledge, cultural competence, and real-time cognitive processing. The present study addresses this gap by examining whether targeted microlearning interventions can enhance knowledge retention and interpreting performance in a specialized domain.

Despite these advantages, the literature also points to a number of limitations and conditions that affect the effectiveness of microlearning. For instance, Jomah *et al.* (2016) argue that microlearning is less suitable for developing complex skills or processes that require sustained engagement and the integration of knowledge from multiple domains.

A similar concern is raised by Díaz Redondo *et al.* (2021), who note that microlearning is not particularly effective for teaching abstract or conceptually dense material. They also highlight a practical challenge: the time and effort required to design high-quality audiovisual and interactive micro-content can be a significant barrier to its implementation.

At the same time, other scholars emphasize the advantages of microlearning in specific contexts. For instance, Park and Kim (2018) observe that learners who must balance study with professional responsibilities often find traditional e-learning formats demanding, with dropout rates in some online courses exceeding 50%. They suggest that microlearning offers a more manageable alternative. Because it is organized into short, self-contained units focused

on a single topic, it allows learners to engage with content in brief, accessible sessions. Their study further indicates that microlearning tools and content design approaches are technically viable and well received, particularly in terms of usability, effectiveness, and compatibility with mobile devices.

2. METHODOLOGY

2.1. Research Design

This study employed a quasi-experimental design to investigate the effectiveness of microlearning interventions in interpreter training. The research was conducted with students enrolled in the interpreting program at King Fahd School of Translation (KFST). The study was conducted by utilizing a between-subjects design with an experimental group exposed to microlearning modules and a focus group (control condition) relying on conventional preparation approaches.

2.2. Participants

Participants were divided into two groups: an experimental group consisting of four students (E1, E2, E3, E4) and a focus group consisting of four students (F1, F2, F3, F4). All participants were enrolled in the interpreting program and possessed comparable baseline proficiency levels in the working languages. The small sample size reflects the specialized nature of interpreter training programs and allows for detailed qualitative analysis of individual performance characteristics.

2.3. Materials and Intervention

The microlearning intervention consisted of targeted modules focused on the specialized domain of cloud seeding, which is a topic relevant to contemporary international discourse on climate intervention technologies. The microlearning modules were developed following established principles identified in the literature, including brevity (modules under five minutes), focus on specific concepts, integration of multiple modalities (text, audio, visual, and graphic materials), and accessibility through digital delivery platforms.

The modules specifically addressed terminology related to cloud seeding processes, relevant meteorological concepts, chemical and physical principles underlying weather modification techniques, and contextual understanding of climate intervention debates. The content was designed to provide direct terminological equivalents in source and target languages, drilling terms through spaced repetition, offering overviews of specialized concepts in digestible formats, and familiarizing trainees with the types of information needed for effective interpreting in this specialized domain.

Students in the experimental group received access to these microlearning modules over a period of two weeks prior to the interpreting task, with the opportunity to engage with the materials at their convenience through mobile learning integration and cloud-based solutions. The focus group received no specialized preparation materials on cloud seeding, and this group relied

instead on their general knowledge of climate change and conventional research approaches.

2.4. Interpreting Task

All participants were required to complete an interpreting task involving content related to cloud seeding. The task was designed to be a speech that reflects the types of specialized technical content that interpreters encounter in international scientific and policy contexts. The interpreting performance was recorded and subsequently evaluated using a structured rubric.

2.5. Evaluation Criteria

Performance was evaluated across four primary criteria, each rated on a five-point scale:

1. **Accuracy:** The degree to which the interpreted message faithfully conveyed the meaning and content of the source message, including factual correctness and absence of omissions or distortions.
2. **Clarity and Fluency:** The quality of the target language output in terms of intelligibility, natural flow, appropriate pacing, and absence of hesitations.
3. **Terminology Usage:** The correct and consistent application of specialized terms related to cloud seeding, meteorology, and climate intervention, including appropriate register and technical precision.
4. **Cultural and Contextual Understanding:** The demonstration of awareness regarding the broader context of climate intervention debates, appropriate framing of technical concepts for target audiences, and sensitivity to cultural dimensions of environmental policy discourse.

2.6. Data Analysis

Quantitative analysis compared mean scores between the experimental and focus groups across each evaluation criterion. Given the small sample size, the study emphasized descriptive analysis and careful interpretation of score patterns rather than inferential statistical testing. Qualitative analysis examined specific instances of terminological accuracy, contextual comprehension, and performance challenges to provide deeper insight into the mechanisms through which microlearning may influence interpreting performance.

3. RESULTS

3.1. Overall Performance Comparison

The results demonstrate clear performance differences between the experimental group exposed to microlearning modules and the focus group relying on general knowledge. Table 1 presents the complete performance data across all evaluation criteria for both groups.

Table 1: Performance Scores by Group and Evaluation Criteria

Student	Accuracy	Clarity & Fluency	Terminology	Cultural & Contextual Understanding
Experimental Group				
E1	5	4	5	4
E2	4	4	4	3
E3	5	5	5	5
E4	4	3	4	4
Mean	**4.50**	**4.00**	**4.50**	**4.00**
Focus Group				
F1	3	3	2	3
F2	4	3	3	2
F3	3	2	2	3
F4	3	3	2	2
Mean	**3.25**	**2.75**	**2.25**	**2.50**

3.2 Performance by Evaluation Criteria

Accuracy: The experimental group achieved a mean accuracy score of 4.50 compared to 3.25 for the focus group with a difference of 1.25 points on the five-point scale. This substantial difference indicates that exposure to microlearning modules enabled participants to more faithfully convey the source message content, with fewer omissions, distortions, or factual errors. Half of the experimental group participants achieved the highest possible accuracy score while no focus group participant exceeded a score of 4.

Clarity and Fluency: The experimental group demonstrated a mean score of 4.00 for clarity and fluency compared to 2.75 for the focus group (a difference of 1.25 points). This finding suggests that familiarity with specialized terminology acquired through microlearning modules contributed to more confident and fluid delivery. This may have contributed to reducing hesitations and false starts that typically occur when interpreters encounter unfamiliar technical terms. The focus group's lower scores in this dimension reflect the cognitive load imposed by attempting to process and render unfamiliar specialized content in real time.

Terminology Usage: The most pronounced difference between groups appeared in terminology usage, with the experimental group achieving a mean score of 4.50 compared to 2.25 for the focus group with a difference of 2.25 points. This substantial gap demonstrates the direct impact of targeted microlearning modules focused on specialized terminology. The experimental group consistently applied correct technical terms with appropriate precision and register while the focus group frequently struggled with terminological

accuracy and often resorting to general descriptions or approximate equivalents that lacked technical precision.

Cultural and Contextual Understanding: The experimental group achieved a mean score of 4.00 compared to 2.50 for the focus group (a difference of 1.50 points). This finding indicates that the microlearning modules provided not only terminological knowledge but also broader contextual framing that enhanced participants' ability to situate technical content within relevant policy and cultural frameworks. The experimental group demonstrated greater awareness of the theme, thus, enabling more sophisticated and contextually appropriate interpretation.

3.3. Individual Performance Patterns

A closer look at individual performance reveals some important differences within and between the groups. In the experimental group, participant E3 achieved the highest overall results, scoring 5 in accuracy, clarity and fluency, terminology, as well as cultural and contextual understanding. This suggests a strong command of both the subject matter and the delivery of the interpretation. By contrast, participant E4 showed weaker performance in clarity and fluency. This indicates that, while microlearning may have supported the acquisition of terminology, differences in confidence and language delivery still play a significant role.

In the focus group, participant F2 obtained the highest accuracy score (4), suggesting that solid general interpreting skills can partially compensate for a lack of specialized knowledge. However, this participant's terminology score remained limited (3), pointing to gaps in domain-specific competence.

The other participants in the focus group (F1, F3, and F4) faced more consistent difficulties across all criteria. Their performance was particularly weak in the use of terminology, where all three scored only 2. This highlights the limits of general preparation when dealing with highly specialized content.

4. DISCUSSION

The findings of this study offer clear evidence that microlearning can improve interpreting performance, especially in specialized fields that require precise terminology and strong contextual understanding. The experimental group consistently outperformed the focus group across all evaluation criteria, supporting the view that targeted microlearning modules can enhance both retention and practical application.

One of the most notable results concerns terminology use. The experimental group scored, on average, 2.25 points higher than the focus group on a five-point scale. This difference is substantial and reflects the core strength of microlearning.

As Shail (2019) explains, microlearning helps counter the Ebbinghaus forgetting curve through spaced repetition and gradual consolidation of

information. In this study, the short and focused modules on cloud seeding terminology appear to have supported this process. When participants encountered these concepts during the interpreting task, they were able to recall the appropriate terms quickly, rather than relying on vague approximations or general explanations.

In addition to this, improvements in accuracy, clarity, and fluency suggest broader effects. When interpreters are confident in their terminology, they no longer need to devote as much cognitive effort to searching for words. This allows them to focus more on the accuracy of the message and the smoothness of delivery.

This pattern is consistent with findings reported by Sirwan Mohammed *et al.* (2018), who observed measurable gains in learning performance with microlearning approaches. It also aligns with the principles discussed by Chang De Gagne *et al.* (2019), particularly in relation to cognitive load. By breaking content into smaller units, microlearning supports repeated processing and helps transfer information into long-term memory.

The results also reveal the multidimensional impact of microlearning beyond simple terminological drilling. The experimental group's superior performance in cultural and contextual understanding suggests that well-designed microlearning modules can provide holistic domain orientation rather than isolated lexical knowledge.

This finding supports the observations of Jomah *et al.* (2016), who note that one of the salient features of microlearning is that it allows users to find exactly what they are looking for while simultaneously enriching knowledge input through small bursts of learning objects. The microlearning modules on cloud seeding apparently provided not only term equivalents but also contextual framing that enabled participants to grasp the broader scientific and policy debates surrounding weather modification technologies.

The size and consistency of the performance differences observed in this study are in line with findings from other educational settings. For example, Nikou and Economides (2018) reported that mobile-based microlearning led to higher gains in factual knowledge and increased learners' sense of competence compared to traditional homework methods.

Similar results were found by Zarshenas *et al.* (2022), who showed that microlearning improved both learning outcomes and self-efficacy in nursing education.

All in all, these studies reinforce the present findings and suggest that the benefits of microlearning are not limited to one field. This study extends that evidence to interpreter training, showing that the same cognitive and motivational advantages can support performance in a demanding, skill-based context.

A particularly important result concerns terminology use. The improvement observed here is consistent with the findings of Enachescu (2024), who reported strong effects of microlearning on skill acquisition. In the field of interpreting, terminology is not a minor detail, it is central to both accuracy and professional quality. The focused structure of microlearning seems especially effective for this type of learning, where students need to acquire specific terms and use them appropriately in context.

The study's demonstration of microlearning's effectiveness within a small-group, specialized training context also resonates with Gassler *et al.* (2004). They found remarkably high acceptance rates and engagement with Integrated Micro Learning despite initially assuming that forced interaction would be necessary. The voluntary engagement and evident benefits observed in the present study suggest that interpreter trainees recognize the value of focused, accessible preparation materials and are motivated to utilize them when such resources are available.

Several factors help explain why microlearning proved effective in this interpreter training context. First, the short and focused design of the modules fits well with the limits of cognitive processing. Learners can engage with specialized content without becoming overwhelmed. As Shail (2019) notes, long learning sessions often lead to mental fatigue, which can hinder retention. By keeping content brief and manageable, microlearning supports more efficient encoding of information.

Second, the flexibility of microlearning makes it easier to fit into trainees' schedules. Interpreter training is often demanding, and time constraints can limit preparation. Dolasinski and Reynolds (2020) point out that traditional, time-intensive training formats can become impractical under such conditions. In contrast, short modules that can be accessed at any time make it more likely that learners will engage consistently, even when they have competing responsibilities.

Third, the modular structure allows for targeted preparation. Instead of reviewing broad and sometimes irrelevant material, trainees can focus on the specific terminology and concepts needed for a given interpreting task. This approach closely reflects the "just-in-time" learning model discussed by Leong *et al.* (2021), where learning is directly aligned with immediate needs.

Finally, the use of multiple formats, such as text, audio, visuals, and graphics, adds another layer of effectiveness. This multimodal design supports different learning preferences and reinforces understanding through multiple channels. As noted by Dolasinski and Reynolds (2020), the use of multiple modes of input can enhance both understanding and long-term retention.

5. LIMITATIONS OF THE STUDY

Several limitations must be acknowledged when interpreting the findings of this study. The small sample size of eight participants limits the generalizability of results and precludes robust inferential statistical analysis. While the observed performance differences are substantial and consistent across all evaluation criteria, replication with larger samples is necessary to confirm these patterns and to examine potential moderating variables such as prior subject knowledge, language proficiency levels, and individual learning preferences.

The study focused on a single specialized domain (cloud seeding) and one interpreting task. Although this domain offers a relevant case study, given its technical terminology and its presence in current international discussions, the extent to which these findings apply to other domains remains uncertain.

Interpreters work across a wide range of subject areas, which differ in their demands. Some fields place greater emphasis on precise terminology, while others require broader conceptual understanding. These differences may affect how effective microlearning is in each context.

The evaluation was based on a structured rubric and expert ratings, rather than on direct measures of communicative effectiveness or user comprehension. Although this approach is commonly used in interpreter training research and offers useful insight into performance quality, it inevitably involves a degree of subjectivity. Future studies could address this limitation by incorporating additional measures, such as audience comprehension or overall communication effectiveness. This would help provide a more complete and objective assessment of performance differences.

The study did not include measures of long-term retention or transfer. While the experimental group demonstrated superior performance immediately following exposure to microlearning modules, it remains uncertain whether these knowledge gains persist over extended periods or transfer effectively to interpreting tasks involving related but distinct specialized content. As Shail (2019) emphasizes, the long-term memory benefits of microlearning depend on spaced repetition and reactivation. Longitudinal research examining retention and transfer would strengthen understanding of microlearning's sustained impact.

Finally, the study did not systematically examine the optimal design characteristics of microlearning modules for interpreter training. Variables such as module length, degree of interactivity, inclusion of assessment questions, sequencing strategies, and integration of collaborative elements may all influence effectiveness. Park and Kim (2018) note that microlearning content development requires careful attention to pedagogical design principles. Systematic investigation of design parameters would provide valuable guidance for developing optimized microlearning resources. The

study also lacks a qualitative dimension. The absence of complementary methods, such as semi-structured interviews or reflective journals, represents a further limitation. Such instruments could have shed light on participants' subjective experiences of microlearning, including their perceived ease of use, motivation, and awareness of how the modules supported their preparation.

CONCLUSION

This study provides empirical evidence that targeted microlearning interventions can significantly enhance interpreting performance among trainee interpreters, particularly in specialized domains requiring mastery of technical terminology and contextual knowledge. Participants exposed to brief, focused microlearning modules on cloud seeding demonstrated substantially higher performance across all evaluation criteria, with particularly pronounced advantages in terminology usage and accuracy. These findings extend the growing body of literature demonstrating microlearning's effectiveness across diverse educational contexts to the specialized field of interpreter training.

The theoretical foundations underlying microlearning's effectiveness, including cognitive load management, facilitation of spaced repetition and memory consolidation, and support for autonomous learning, align well with the specific demands of interpreter training. Professional interpreters must rapidly activate specialized knowledge across diverse domains under time-constrained conditions. The ability to access focused, accessible learning resources that efficiently address specific knowledge gaps represents a valuable addition to traditional comprehensive training approaches.

The pedagogical implications of these findings suggest that interpreter training programs should consider systematic integration of microlearning resources as supplements to conventional instruction, with particular attention to mobile accessibility, terminology drilling, contextual framing, and support for learner autonomy. While challenges exist regarding resource development and optimal design principles, the substantial performance benefits demonstrated in this study justify investment in microlearning implementation.

Future research should address the limitations of this initial investigation through large-scale validation studies, longitudinal examination of retention and transfer, systematic investigation of design parameters, and exploration of optimal integration models. Such research will strengthen the evidence base supporting microlearning in interpreter training and provide practical guidance for effective implementation.

REFERENCES

American Translators Association. (2024). Translator vs. interpreter.

https://www.atanet.org/client-assistance/translator-vs-interpreter/

Cepeda, N. J., Pashler, H., Vul, E., Wixted, J. T., & Rohrer, D. (2006). Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychological Bulletin*, 132(3), 354-380. https://doi.org/10.1037/0033-2909.132.3.354

Coursera. (2024). What is microlearning? Definition, use cases, and more. https://www.coursera.org/enterprise/articles/what-is-microlearning

De Gagne, J.C., Park, H.K., Hall, K., Woodward, A., Yamane, S., & Kim, SS. (2019). Microlearning in health professions education: Scoping review. *JMIR Medical Education*, *5*(2), e13997. https://doi.org/10.2196/13997

Díaz Redondo, R. P., Caeiro Rodríguez, M., López Escobar, J. J., & Fernández Vilas, A. (2021). Integrating micro-learning content in traditional e-learning platforms. *Multimedia Tools and Applications*, *80*, 3121-3151. https://doi.org/10.1007/s11042-020-09523-z

Digiforma. (2024). Definition microlearning.

https://www.digiforma.com/en/definition/microlearning/

Dolasinski, M. J., & Reynolds, J. (2020). Microlearning: A new learning model. *Journal of Hospitality & Tourism Research*, *44*(4), 551-561.

https://doi.org/10.1177/1096348020901579

Enăchescu, V. A. (2025). Microlearning and lifelong learning: effects on skill acquisition and 'learning-to-learn' competencies in higher education. *International Journal of Education, Leadership, Artificial Intelligence, Computing, Business, Life Sciences, and Society*, *2*(02), 1-12. https://doi.org/10.65222/VIRAL.2025.9.5

Gassler, G., Hug, T., & Glahn, C. (2004). Integrated micro learning: An outline of the basic method and first results. *Interactive Computer Aided Learning Conference Proceedings*.

Hug, T. (2005). Micro learning and narration: Exploring possibilities of utilization of narrations and storytelling for the designing of "micro units" and didactical micro-learning arrangements. *Paper presented at the fourth Media in Transition conference*. Massachusetts Institute of Technology (MIT). https://web.mit.edu/comm-forum/legacy/mit4/papers/hug.pdf

Job, M. A., & Ogalo, H. S. (2012). Micro learning as innovative process of knowledge strategy. *International Journal of Scientific & Technology Research*, *1*(11), 92-96.

Jomah, O., Masoud, A. K., Kishore, X. P., & Aurelia, S. (2016). Micro learning: A modernized education system. *BRAIN: Broad Research in Artificial Intelligence and Neuroscience*, *7*(1), 103-110. https://www.edusoft.ro/brain/index.php/brain/article/view/582

Leong, K., Sung, A., Au, D., & Blanchard, C. (2021). A review of the trend of microlearning. *Journal of Work-Applied Management*, *13*(1), 88-102. https://doi.org/10.1108/JWAM-10-2020-0044

Nikou, S. A., & Economides, A. A. (2018). Mobile-based micro-learning and assessment: Impact on learning performance and motivation of high school students. *Journal of Computer Assisted Learning*, *34*(3), 269-278. https://doi.org/10.1111/jcal.12240

Park, Y., & Kim, Y. (2018). A design and development of micro-learning content in e-learning system. *International Journal of Advanced Science Engineering Information Technology*, *8*(1), 56-61.

Shail, M. S. (2019). Using micro-learning on mobile applications to increase knowledge retention and work performance: A review of literature. *Cureus*, *11*(8), e5307. https://doi.org/10.7759/cureus.5307

Sirwan Mohammed, G., Wakil, K., & Sirwan Nawroly, S. (2018). The effectiveness of microlearning to improve students' learning ability. *International Journal of Educational Research Review*, *3*(3), 32-38. https://doi.org/10.24331/ijere.415824

Zarshenas, L., Mehrabi, M., Karamdar, L., Keshavarz, M. H., & Keshtkaran, Z. (2022). The effect of micro-learning on learning and self-efficacy of nursing students: An interventional study. *BMC Medical Education*, *22*, 664. https://doi.org/10.1186/s12909-022-03726-8