

Research on Developing a Pilot Digital Database Using Microlearning to Enhance Vocabulary for Foreigners Learning Vietnamese as a Foreign Language

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Abstract: This study focuses on the development and evaluation of a digital corpus system designed in a microlearning format to support Vietnamese vocabulary acquisition among foreign learners. The learning content is presented through short videos that combine images, audio, subtitles, and communicative contexts, helping learners absorb and memorize vocabulary more effectively. The study applies a Design-Based Research method combined with a Mixed Methods Research method. An experiment was conducted with 68 international students at Thai Nguyen University of Education through a Microlearning video system combined with online vocabulary practice activities. The results show that the Microlearning materials have a positive impact on learners' ability to acquire and apply vocabulary; the average vocabulary test score increased from 13.2 to 17.1/20 after the experiment. Simultaneously, the percentage of learners achieving good and excellent levels increased significantly. The initial research results confirm the feasibility of applying Microlearning in teaching Vietnamese as a foreign language and suggest directions for developing digital learning materials in the current digital education context.

Keywords: Vietnamese as a Foreign Language; Vietnamese Vocabulary; Vocabulary Development; Digital Materials; Microlearning.

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I. INTRODUCTION

In the process of learning a foreign language, vocabulary is considered as one of the core elements that determine the learner's ability to communicate. If grammar provides the structure of a sentence, then vocabulary is the means to convey the content and meaning of the message. According to Nation, I. S. (2001) [8], the development of vocabulary is directly related to the learner's ability to understand and use the language. The more vocabulary a learner possesses, the more capable they are of understanding texts, participating in conversations, and expressing ideas more effectively for international students.

For international students learning Vietnamese, developing a strong vocabulary is crucial as it forms the foundation for adapting to the learning and living

environment in Vietnam. When acquiring Vietnamese as a foreign language, learners must do more than simply comprehend word meanings. They also need to master multiple dimensions of vocabulary—such as pronunciation, collocations, subtle semantic distinctions, and contextual appropriateness in real communicative situations. These elements are essential for building practical communication skills and helping learners achieve more authentic, natural Vietnamese usage.

Vietnam's Circular 17/2015/TT-BGDĐT sets out a language proficiency framework for foreign learners of Vietnamese. According to this framework, learners at the elementary and intermediate levels should be able to understand and use words that come up in everyday situations—topics like travel, studying, work, the environment, and social activities. This means that building

vocabulary around real-life communication needs is a key part of teaching Vietnamese to foreigners. But in practice, learning vocabulary often turns out to be quite difficult. One major reason is the sheer number of new words learners are expected to take in during each lesson. When they have to absorb too many new words quickly, they can easily feel overwhelmed. This mental overload makes it hard to remember the words for very long, and even harder to use them when actually trying to communicate. Furthermore, differences in language and cultural systems between Vietnamese and the learner's native language can also create obstacles in the vocabulary acquisition process. Therefore, finding suitable vocabulary teaching methods is a necessary requirement in teaching Vietnamese to international students.

One of the approaches that many researchers are interested in today is breaking down learning content into short knowledge units according to the micro-learning model. This method allows learners to access small groups of vocabulary, focus on a specific learning goal, and review it repeatedly through short learning activities. According to Hug T. (2005) [4], Microlearning allows learners to access knowledge step by step through short learning activities such as video lessons, flashcards, or interactive exercises. Thanks to the characteristics of short and focused content, this method helps reduce cognitive load and increase the learner's ability to remember. According to Mayer R. E. (2009) [7], breaking down and subdividing lessons helps learners process knowledge better because it is consistent with the mechanism of short-term memory.

Another important feature of Microlearning is how flexible and personalized it can be. Learners can access materials anytime and anywhere using mobile devices, which fits well with how people prefer to learn today. Also, when combined with technology—especially artificial intelligence—Microlearning can adjust the content to match each learner's level and needs, making learning more effective. Using Microlearning in vocabulary teaching not only lowers the amount of information learners have to deal with in each session, but also helps them reinforce what they've learned through repetition and practice in different situations. When vocabulary is broken down into small, manageable units and presented with images, sounds, or real-life examples, learners find it easier to remember words and gradually get better at using them in everyday conversations.

This paper aims to build and test a digital corpora system in the form of Microlearning to support vocabulary development for foreigners learning Vietnamese as a foreign language at the intermediate B1 level. The research focuses on designing short, multimedia-integrated, and interactive learning units to enhance memorization and vocabulary usage in real-life communication contexts, while also evaluating the suitability and effectiveness of the Microlearning model in teaching Vietnamese in a digital environment.

II. LITERATURE REVIEW

In the context of digital transformation in education today, the application of technology and social media platforms in teaching is becoming a popular trend to improve the effectiveness of knowledge acquisition for learners. The strong development of the Internet, mobile devices and online learning platforms has created conditions for new learning models, especially Microlearning, to be widely implemented in education. According to Kaplan A. M. & Haenlein M. (2016) [5], the “digital revolution” has changed the way traditional teaching activities are organized, shifting from a one-way knowledge transmission model to flexible, personalized learning forms and increasing the interaction of learners.

For online education, according to De Gagne and co-researchers (2019) [2], Microlearning organizes learning content into small units to support learners in effectively acquiring knowledge, each unit usually focusing on a specific learning content or objective. This model helps learners easily receive, remember and apply knowledge in a short time, and is also suitable for modern learning trends on digital devices. In research on online teaching, Hsin W. J. & Cigas J. (2013) [3] also confirmed that integrating short videos into the learning process helps improve learning outcomes, increase interaction levels and support learners in maintaining participation in the course.

In the field of higher education and professional training, many studies have confirmed the role of social networks in supporting teaching and learning activities. According to Latif, M. Z. and co-researchers (2019) [6] stated that using platforms and technology tools familiar to learners can enhance learning motivation, increase participation levels, and promote interaction among learners in the classroom environment. When learning activities are implemented on platforms familiar with daily usage habits, learners tend to be more proactive and interested in the process of acquiring knowledge. These observations show that microlearning is making a valuable contribution to today's learning environment and is steadily becoming a key part of the future of education.

Regarding the influence of technological development, the TikTok platform is currently considered a potential tool in implementing Microlearning thanks to its ability to create and share short videos quickly, visually, and vividly. According to Bhandari, A., & Bimo, S. (2022) [1], TikTok thrives thanks to its simple interface, allowing users to easily create engaging audiovisual content. In addition, Rand, J. R., & Brushett, S. C. (2021) [10] argue that TikTok videos help bridge the gap between teachers and students, while creating a comfortable, interesting learning environment that suits the information reception trends of the younger generation. This can indicate that TikTok is currently a potential application channel for quickly transmitting knowledge and innovating learning methods for young people.

In Vietnam, the application of digital learning materials according to the micro-learning model in teaching has initially received attention from many researchers. Nguyen Thi Diem Hang, Le Danh Binh and Bui Dinh Dat (2024) [9] believe that the micro-learning model has the ability to attract the attention and focus of learners by breaking down learning content into short, visual and highly interactive knowledge units. The authors emphasize that digital learning materials according to the micro-learning model support teachers in organizing diverse learning activities such as flipped classroom, blended learning, project-based learning or discovery learning. Survey results of Chemistry teachers in Nghe An and Ha Tinh show that most teachers positively evaluate the role and effectiveness of digital learning materials according to the micro-learning model in teaching, although some difficulties related to learning material design skills and technological conditions still exist.

For teaching Vietnamese to international students, vocabulary development is always crucial because vocabulary is the foundation of communication and language use. However, many international students struggle with memorizing and applying vocabulary in real-world contexts, as well as maintaining long-term learning interest. Given this situation, microlearning-with its short and flexible content-offers a promising way to help second language learners build their Vietnamese vocabulary. Using short TikTok videos that combine images, subtitles, everyday conversations, and interactive practice doesn't just help learners remember words better. It also creates a learning experience that fits naturally with how international students currently use technology in their daily lives.

However, there hasn't been much research on using microlearning to teach Vietnamese to international students. This is especially true for studies that use TikTok as a platform to help students build their vocabulary. Therefore, this study aims to investigate and propose a model for applying Microlearning through the TikTok platform in teaching Vietnamese vocabulary to international students, tested on 68 international students from Thai Nguyen University of Education.

III. METHODOLOGY

The research uses Design-Based Research combined with Mixed Methods Research to build and evaluate the effectiveness of digital learning materials in the form of Microlearning in developing vocabulary for foreigners learning Vietnamese as a foreign language.

The research process consists of four stages: (1) surveying learners' vocabulary learning needs; (2) designing and building digital learning materials in the form of Microlearning; (3) conducting experiments; and (4) evaluating and adjusting the learning materials.

The experimental subjects consisted of 68 foreign students learning Vietnamese at the intermediate B1 level, from Laos, Russia, Mongolia, Philippines, Mozambique,

and Palestine at Thai Nguyen University of Education. Data was collected through questionnaires, semi-structured interviews, pre- and post-experiment tests, and learner feedback.

Quantitative data was processed using descriptive statistics and t-tests to assess changes in learning outcomes before and after the experiment. Qualitative data was analyzed using topic analysis to clarify the learning experience and level of interaction of learners with the Microlearning model.

IV. RESULTS

➤ *Results of Building a Digital Corpora in the Form of Microlearning to Develop Vietnamese Vocabulary*

• *Basis and Design Principles*

The learning materials are built based on the characteristics of intermediate learners at the B1 level, suitable for the goal of developing the ability to use Vietnamese vocabulary in communication. The learning materials aim to support learners in expanding their vocabulary, increasing long-term retention, and applying vocabulary in real-life contexts.

Based on this, the learning materials are designed in the form of Microlearning with short learning units of 1-2 minutes, focusing on specific objectives to reduce cognitive burden and increase information reception. The learning materials use a mix of video, images, audio, and interactive tasks to keep learners engaged and help them remember vocabulary better.

The vocabulary is built around real-life contexts, drawing on everyday communication situations that international students often face. This helps learners understand what words mean and how to use them in daily life. The project also uses artificial intelligence to help create the learning materials. Artificial intelligence supports tasks like generating content, writing dialogues, adjusting the language level, and designing video lessons that match what learners are ready for.

• *Design Process*

The Microlearning learning materials design process combines pedagogical principles, digital learning materials production processes, and the support of artificial intelligence. The vocabulary content is selected based on the Vietnamese language teaching program for international students at the B1 level at Thai Nguyen University of Education, focusing on topics with high applicability in learning and daily life.

The learning materials are broken down into small, manageable units, following the microlearning approach. Each video runs for about one to one and a half minutes and covers only three to five new words. To put these videos together, the team first creates storyboards for each one. This helps make sure the videos are clear, engaging, and show how the vocabulary can be used in real conversations.

Artificial intelligence plays a role in several parts of the process, including writing dialogues, suggesting contexts, generating images, creating subtitles, recording voice-overs, and helping with video editing. To make the materials more efficient and keep the content lively, the team used tools like ChatGPT, Grok, Cap Cut, and Canvas.

The research results have developed and implemented 10 Microlearning videos on 6 Vietnamese vocabulary topics for international students. The learning materials are uploaded to the TikTok platform through the account “Học

tiếng Việt cùng TNUERS”, contributing to expanding accessibility, supporting self-study, and aligning with the current digital learning trends of learners.

Overall, the design process shows that bringing together microlearning, artificial intelligence, and context-based teaching can produce digital learning materials that are flexible and easy to follow. These materials fit well with how international students learn Vietnamese as a foreign language.

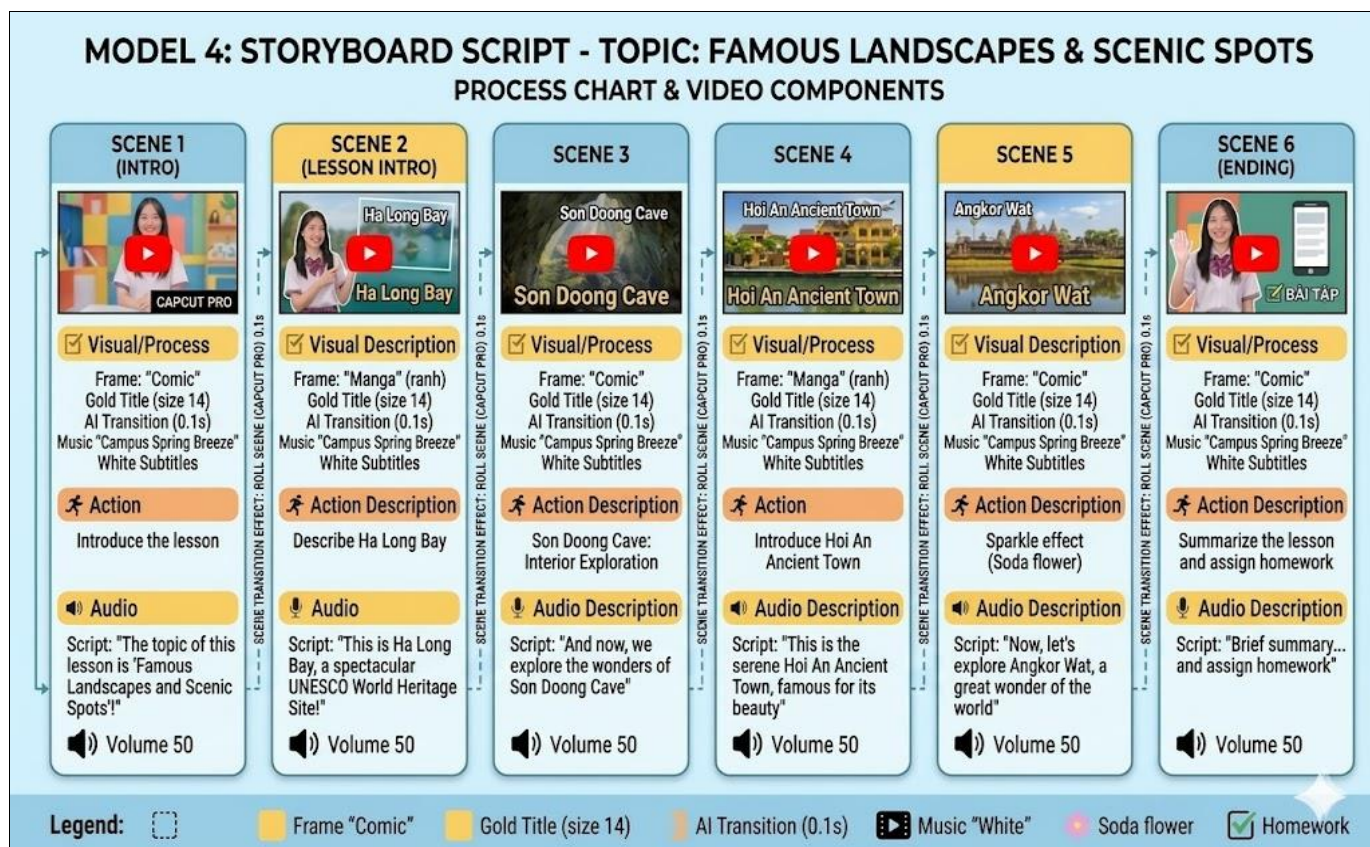


Fig 1 Model of a Microlearning Storyboard Design Scenario

• *Structure of a Microlearning Unit*

Each Microlearning unit is designed as a short learning cycle, consisting of five components: introduction, vocabulary presentation, usage context, application activity (scamper-based), and knowledge consolidation. The components are organized in a logical sequence to support learners in accessing, memorizing, and applying vocabulary in a short time.

The introduction uses questions, images, or thought-provoking situations to create interest and stimulate the learner's cognitive needs. The vocabulary content focuses on 3–5 words in each unit, combining meanings, examples, and illustrative images to enhance multimedia learning effectiveness.

The vocabulary is placed in familiar communication contexts such as learning, daily life, and services to help learners understand how to use the words in practice. The

SCAMPER activity is designed to develop critical thinking skills and flexible vocabulary application through substitution, combination, and expansion of usage context.

Artificial intelligence is applied in many stages of the learning material development process, such as creating dialogues, suggesting examples, designing communication scenarios, generating subtitles, and supporting the development of practice activities. Integrating artificial intelligence contributes to increased flexibility, content diversification, and enhanced personalization of learning materials for learners.

Research results show that the structure of Microlearning materials not only meets the concise characteristics of micro-learning but also supports the development of memorization skills, vocabulary application, and increased pro-activeness among international students in learning Vietnamese as a foreign language.

- *Process of Using the Learning Materials*

The process of using the Microlearning materials is built on a competency-based approach, including the stages of knowledge acquisition, processing, application, and consolidation. Learners access Microlearning videos on the TikTok platform with short durations, visual content, and suitability to current digital device usage habits.

During the learning process, vocabulary is presented through a combination of images, sounds, subtitles, and usage context to support multi-channel acquisition and enhance memorization. Learners simultaneously process information by relating meanings and identifying word usage in specific communication situations.

After the acquisition stage, activities using the SCAMPER technique are implemented to develop the ability to flexibly apply vocabulary through substitution, combination, adjustment, and expansion of usage context. In addition, learners continue to practice on the ViLing app with interactive exercises such as word matching, fill-in-the-blanks, pronunciation recognition, and quick quizzes. The exercise system is designed based on the principle of spaced repetition to enhance long-term memory.

Finally, learners review the material by re-watching videos, redoing exercises, and using memorization tools such as flashcards or mind maps. The research results show that this closed-loop learning process contributes to improving vocabulary learning efficiency, developing self-learning abilities, and increasing the ability to use Vietnamese in practical communication for international students.

➤ *Results of the Microlearning Digital Corpus System Experiment in Developing Vietnamese Vocabulary for Foreigners*

- *Criteria for Evaluating Vocabulary Development Effectiveness*

The evaluation of the effectiveness of the Microlearning digital corpus was based on three main criteria: vocabulary acquisition ability, vocabulary usage ability, and vocabulary application ability in a communicative context. These criteria reflect the level of vocabulary development of international students after the experiment.

The first criterion focuses on the level of vocabulary acquisition and retention through the ability to recognize, recall, and expand vocabulary after participating in learning with Microlearning materials. Results are determined based on a comparison between pre- and post-experiment tests.

The second criterion assesses the ability to use vocabulary in sentences and specific language situations. Learners are required to apply new words in practice

exercises to determine their level of understanding, ability to combine words, and grammatical and semantic accuracy.

The third criterion aims to assess the ability to apply vocabulary in new communication contexts. Learners perform language tasks in real-life situations to determine the level of flexibility and appropriateness in choosing and using vocabulary.

- *Assessment Tools*

The assessment tool system is designed to combine quantitative and qualitative data to comprehensively evaluate the effectiveness of Microlearning materials in developing Vietnamese vocabulary for international students.

The pre-test was used to determine the learners' initial vocabulary proficiency at the A2 level. The test focused on the ability to recognize, memorize, and use vocabulary through multiple-choice questions and short writing exercises. The test results served as the basis for dividing the experimental and control groups, and were compared with the post-experiment results.

The post-experiment test was structured similarly to the pre-test but increased the difficulty level to B1 to assess the learners' vocabulary development and language application skills after the experiment. The assessment focused on the ability to use words in context, expand vocabulary, and create coherent texts.

In addition, learner feedback surveys are used to assess the suitability and effectiveness of learning materials from the learner's perspective. The survey focuses on the level of interest, frequency of use of learning materials, the intuitiveness of the interface, the effectiveness of Microlearning videos, and the system's ability to support learning.

The evaluation results dedicate that the combination of competency tests and learning experience surveys contributes to a relatively comprehensive reflection of the effectiveness of Microlearning materials in supporting the development of Vietnamese vocabulary for international students.

V. DISCUSSION

➤ Quantitative Analysis of Experimental Results

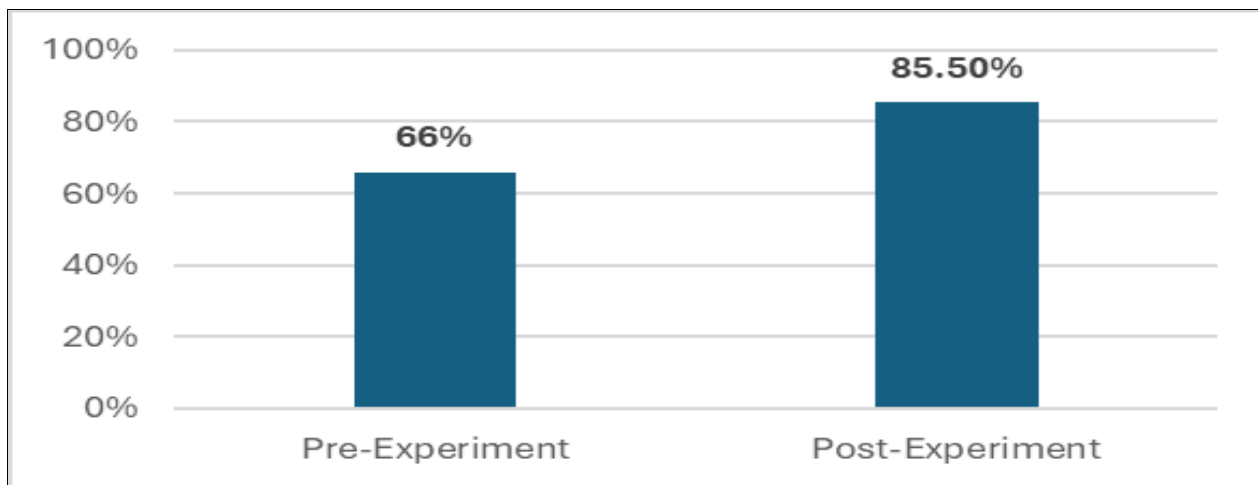


Fig 2 Average Academic Scores of International Students

We collected data from 68 learners, and the results showed a clear improvement in their scores after the experiment. In the initial test, learners got about 13.2 answers right out of 20, which comes to roughly 66 percent. After going through the experiment, the average number of

correct answers rose to 17.1 out of 20, or about 85.5 percent. That’s an average gain of 3.9 correct answers. This jump in scores points to a real increase in how well learners can recognize and understand vocabulary.

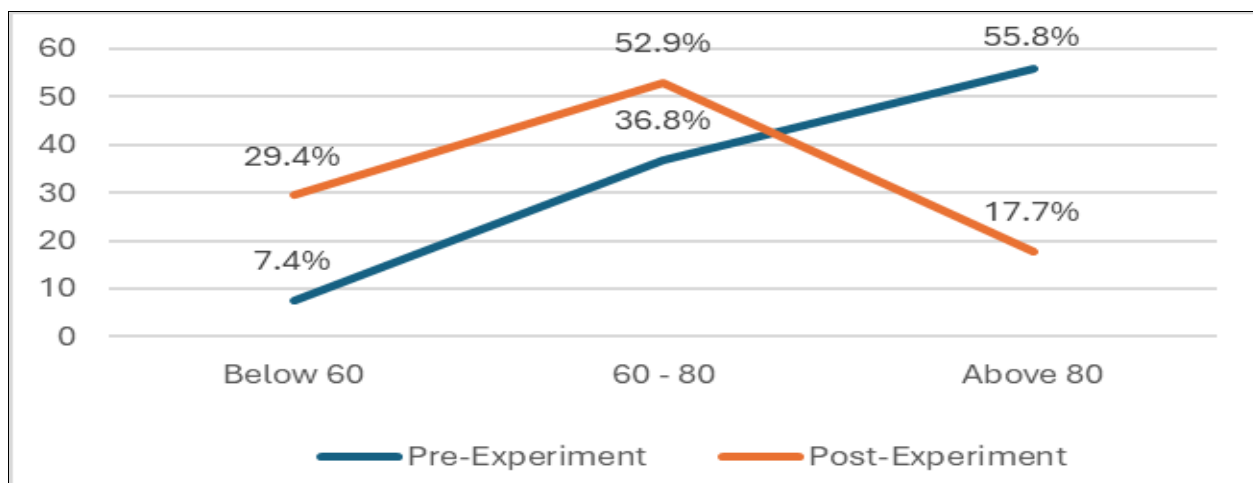


Fig 3 Comparison of Test Score Distribution Pre- and Post-Experiment

The results of the experiment show a clear shift in how learners' scores were distributed after they used the microlearning materials. Before the experiment, most learners were clustered at the lower and average levels. Those who scored below 60% made up 29.4% of the group, while 52.9% scored between 60% and 80%, and only 17.7% scored above 80%. After the experiment, the picture changed noticeably. The share of learners scoring below 60% dropped to 7.4%, and the group scoring above 80% rose to 55.8%, becoming the largest group overall.

correct answers—rose from 12 to 38. At the same time, the number of low-performing learners dropped from 20 to just 5. This suggests that microlearning materials do more than just lift average test scores; they also help raise the overall quality of learners' vocabulary skills.

These results point to a clear move away from average performance and toward above-average and high levels of proficiency. Looking at the actual numbers, the number of learners who earned high scores—meaning 17 or more

correct answers—rose from 12 to 38. At the same time, the number of low-performing learners dropped from 20 to just 5. This suggests that microlearning materials do more than just lift average test scores; they also help raise the overall quality of learners' vocabulary skills.

In addition to the multiple-choice section, the results from the written test also showed clear progress in how well learners could use vocabulary in context. The average score on the essay part went up from 2.1 out of 4 before the experiment to 3.1 out of 4 afterward. This change shows that learners became better at using words more flexibly when expressing themselves—especially when it came to picking the right words for a given situation and organizing what they wanted to say in Vietnamese.

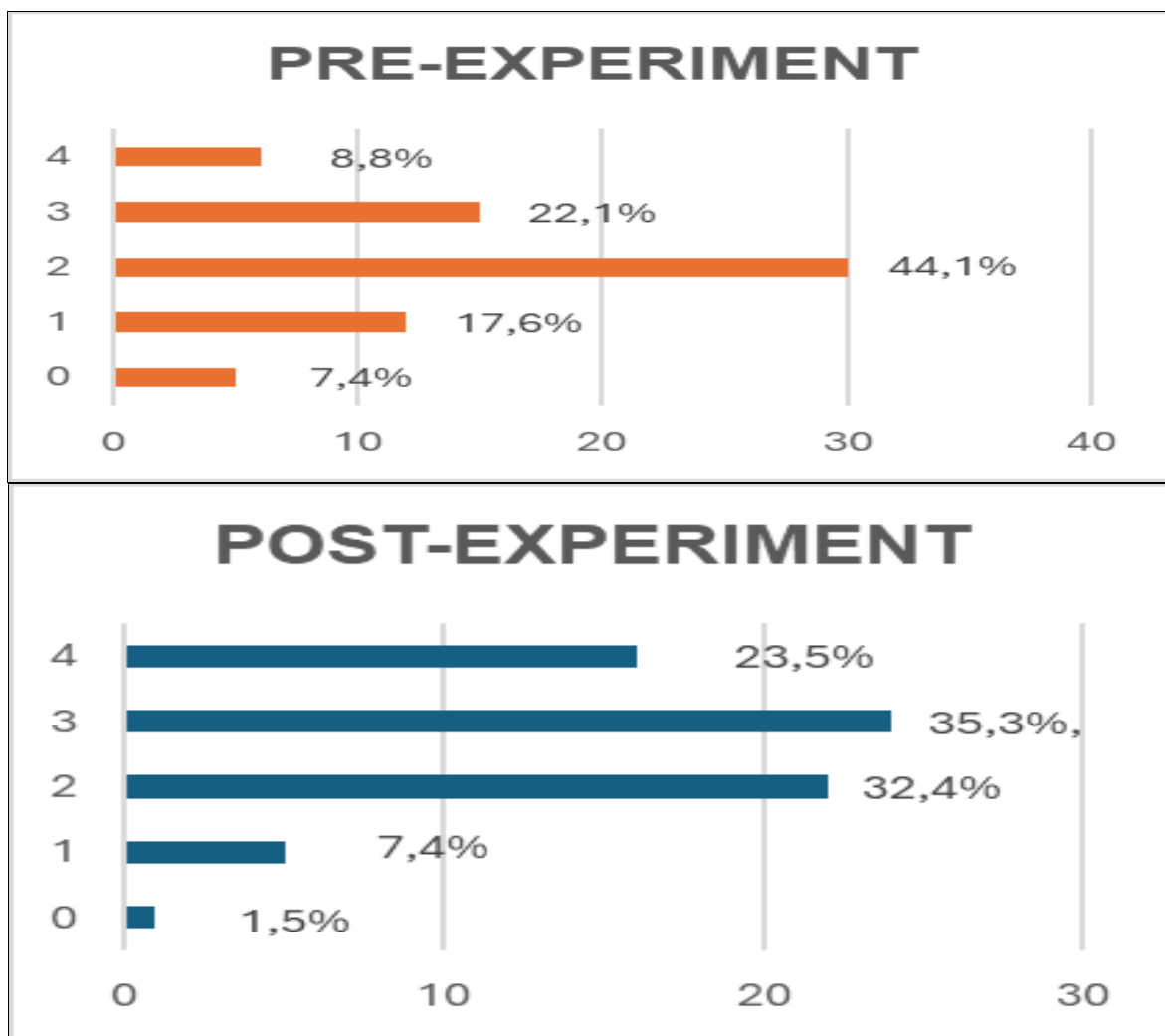


Fig 4 Vocabulary Usage Levels in International Students' Essays

Looking at the essay test results, learners improved noticeably in their ability to use vocabulary after the experiment. Before the experiment, most learners were at average or low levels. The group that scored between 0 and 1 point made up 25% of the participants, while those who reached good or excellent levels (scores of 3 to 4) were only 30.9%. After the experiment, the picture changed. The share of low-level learners dropped to 8.8%, and the good-to-excellent group rose to 58.8%, becoming the largest group. This shift shows a positive change in how learners are able to use vocabulary.

The improvement shows up not just in the test scores, but also in how learners actually used language in their writing. After the experiment, the number of vocabulary words learners included in their essays went up from about 12 to 15 words to roughly 20 to 25 words. The range of different words they used nearly doubled, and they repeated themselves far less often. In addition, about 85% of the time, they chose words that fit the context correctly. This suggests that learners became more skilled at picking and using words naturally when expressing their ideas.

The findings also show that bringing together Microlearning, SCAMPER techniques, and artificial

intelligence technology offers good support for building vocabulary skills. Artificial intelligence helps by giving fast feedback, offering a variety of contexts, and tailoring learning content to individual needs. SCAMPER, on the other hand, encourages learners to think critically, adapt what they've learned, and use their vocabulary in different communication situations.

To sum up, the multiple-choice and essay test results show that learners didn't just get better at recognizing and remembering vocabulary. They also made real progress in using words in actual communication. These early findings suggest that the microlearning materials model works well and is practical for teaching Vietnamese to international students.

➤ *Quantitative Analysis of Feedback Survey Results*

After using the microlearning videos, we surveyed the 68 international students involved. Most of them gave positive feedback on this learning model. The survey data, shown in the charts, covers how much students interacted with the videos, how satisfied they felt, and how well they thought the videos helped them learn Vietnamese vocabulary through short clips on digital platforms.

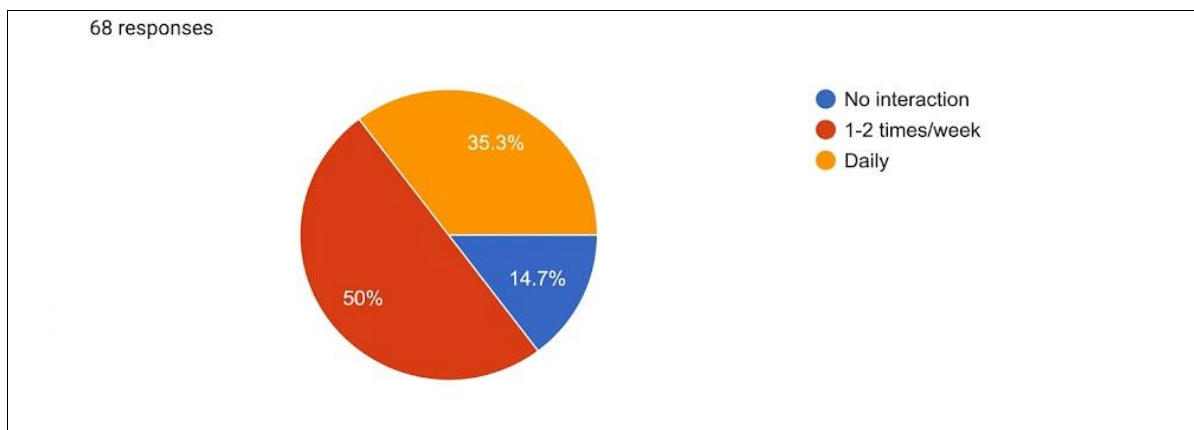


Fig 5 Usage Frequency of Microlearning Video-Based Learning Materials Among International Students

Regarding the frequency of interaction with the learning toolset, the majority of international students reported frequently using Microlearning videos and learning support applications during their Vietnamese language

studies. This result suggests that learning with short videos can keep students engaged and motivated in an online setting.

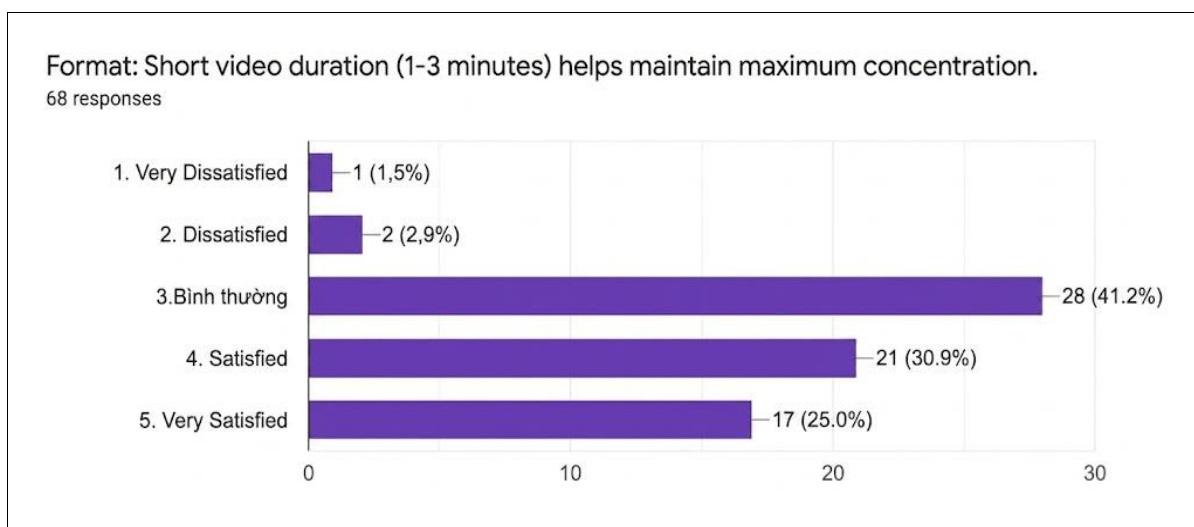


Fig 6 International Students' Satisfaction with the Format of Microlearning Videos

When it comes to how satisfied learners were with the microlearning video format, most international students gave high marks to the videos for being short, easy to

follow, and visually appealing. This suggests that using images, subtitles, and audio in the videos helped learners stay focused and remember the information better.

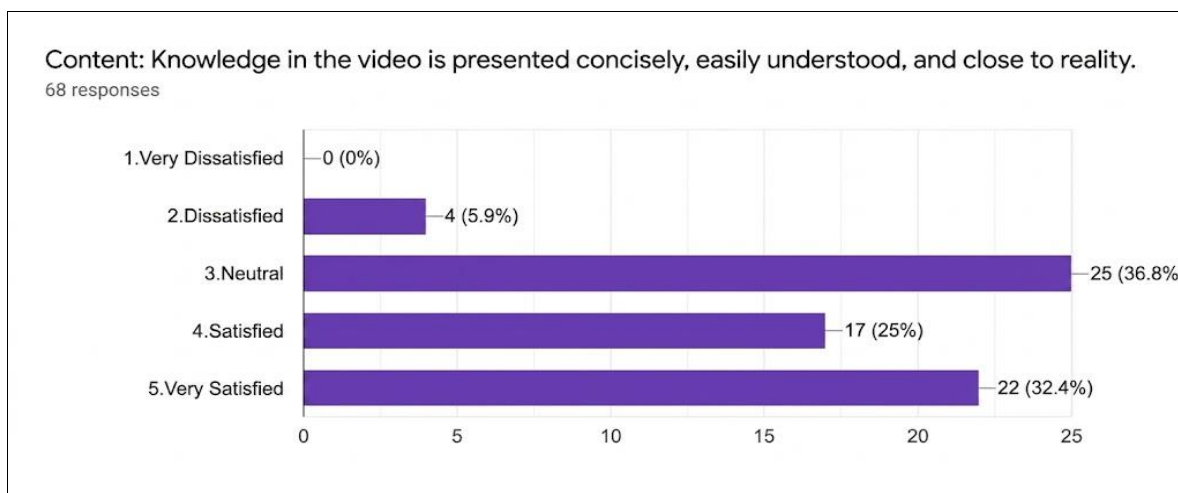


Fig 7 International Students' Satisfaction with the Content of Microlearning Videos

According to the survey results on video content, most international students were happy with the vocabulary and the communication situations shown in the videos. Learners believe that the content is divided into small knowledge units, making the process of memorizing and reviewing vocabulary easier. The chart shows that 32.4% and 25% of international students said they were happy with how short and easy to use the videos were. This points to a positive effect from the microlearning video content used in the experiment.

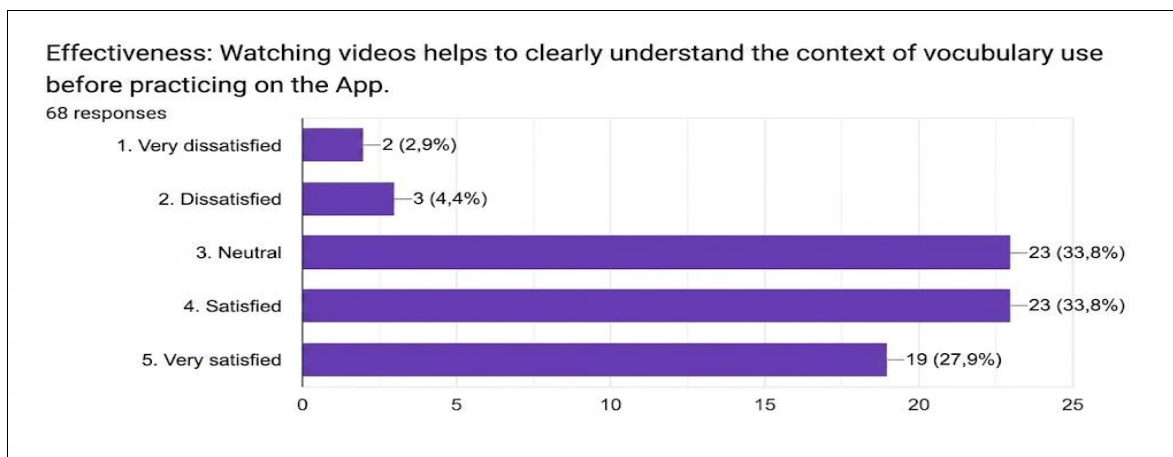


Fig 8 International Students’ Satisfaction with the Effectiveness of Microlearning Videos

The survey also looked at how effective students found the microlearning videos. Most international students felt that this way of learning helped them remember vocabulary better, improve their pronunciation, and use words more

effectively in real conversations. When asked about their overall satisfaction with the videos, the majority gave positive responses. Specifically, 27.9% said they were very satisfied, and another 33.8% said they were satisfied.

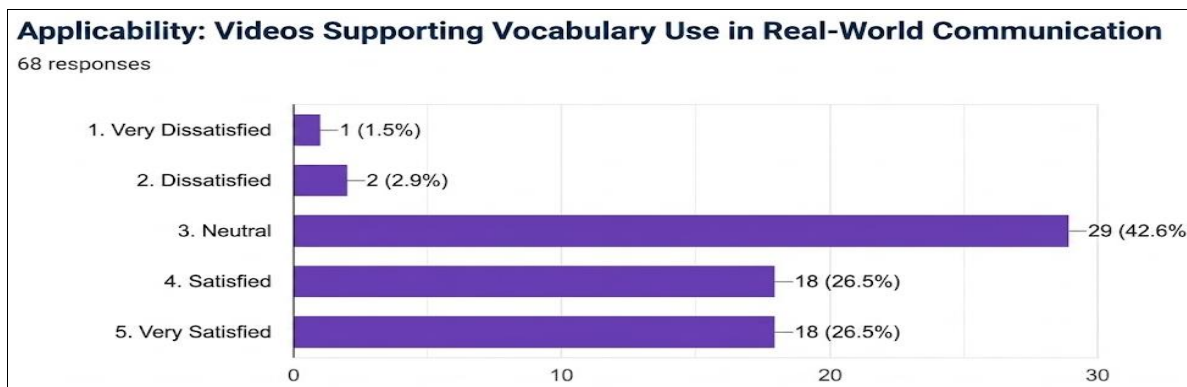


Fig 9 International Students’ Satisfaction with the Applicability of Microlearning Videos

The survey also asked about how well students could put their knowledge to use. Many international students said they were able to apply the vocabulary they learned to real conversations and classroom activities. This suggests that microlearning videos do more than just help with memorization. They also play a role in helping learners use vocabulary in real-life situations.

thinking techniques to the practice activities helps learners move beyond simple memorization. Instead, they learn to think about words, adapt them, and use them in different communication situations. This more active way of learning helps vocabulary feel more connected to real life, which in turn improves how well learners can actually use the language. On the teaching side, artificial intelligence provides useful support. It helps generate a wide range of communication scenarios and multiple-choice questions that match the B1 level standards. This saves teachers a lot of time when preparing materials, while still making sure there is plenty of practice content available for students.

➤ *Advantages and Limitations of the Microlearning Digital Learning Materials Model*

• *Advantages*

What makes this model stand out is that it creates a continuous learning ecosystem using digital materials designed as microlearning. By breaking down knowledge into small, clear, and easy-to-digest pieces, this approach helps prevent learners from feeling overwhelmed and makes it easier for them to stay focused. Adding SCAMPER

• *Limitations and Causes*

Alongside the successes, the experiment also brought up some limitations that are worth noting for future improvement. First, the model did not work equally well for all learners. This was largely due to differences in their

starting levels, self-discipline, and study habits. For some learners, shifting from simply receiving information to actively applying SCAMPER's thinking steps caused a mental block. They felt confused and needed extra time to adjust.

On the teaching and technology side, using large language models to generate content still has some built-in problems. artificial intelligence can sometimes produce sentences that are grammatically correct but do not sound natural. It may also miss the right tone or feel of an expression, or create communication situations that seem forced. Because of this, instructors had to spend additional time manually checking and fixing the content before using it. Also, relying on personal devices and internet access can get in the way of independent learning for international students.

VI. CONCLUSION

This study developed and tested a digital learning materials model that combines microlearning with artificial intelligence and SCAMPER techniques to help international students build their Vietnamese vocabulary. The findings confirm that vocabulary plays a key role in how learners pick up the language, communicate, and settle into a new culture—just as it does for anyone learning a foreign language. Bringing together microlearning and artificial intelligence in digital materials helps lighten the cognitive load, makes learning more engaging, and supports learners in using words more naturally in everyday conversations.

The experiment involved 68 international students at Thai Nguyen University of Education. Results showed clear gains in how well they learned, remembered, and used vocabulary. Scores on both multiple-choice and writing tests went up after the experiment. Learners also moved away from simply memorizing words and began using them more actively and flexibly.

The study also points to the promise of bringing together linguistics, educational technology, and creative thinking to refresh the way Vietnamese is taught in today's digital age.

Despite the efforts of the authors, the study has a few limitations. These include differences in how well learners could study on their own, as well as the fact that language generated by artificial intelligence does not always sound natural. For this reason, using artificial intelligence in language teaching will need further adjustments and improvements under the guidance of teachers.

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