DOI:10.59787/2413-5488-2025-49-1-67-82

[1]Ainash Kussainova, **[1]Roza Zhussupova**, **[2]Rustam Shadiev**

[1]L.N. Gumilyov Eurasian National University, Astana, Kazakhstan
[2] Zejiang University, Zhejiang Province, People's Republic of China

ENHANCING COMPETENCIES AND MOTIVATION: THE IMPACT OF 360-DEGREE VIDEO TECHNOLOGY ON FUTURE FOREIGN LANGUAGE TEACHERS

Abstract: This study examines an innovative approach to the training of foreign language teachers using 360-degree video technology. The current method is a unique combination of existing techniques, combining immersive learning and the development of professional competencies. The investigation highlights the novelty of the problem, which lies in the lack of development of approaches that integrate immersive technologies into the professional education of teachers. The research conducted among students of the Eurasian National University who completed a course on integrating 360-degree video into the educational process. The focus is on analyzing the impact of 360-degree video technology on the development of key professional competencies: pedagogical adaptability, cultural awareness, classroom management skills, reflective practices, technology proficiency, and student engagement strategies. The model presented in the study demonstrates the interrelationship of these competencies, suggesting a new research paradigm for teacher education. The results showed a significant improvement in all competencies after using technology, especially in the areas of creative thinking (+7 points) and technological competence (+7 points). There was also an increase in student motivation due to the use of new teaching methods.

Keywords: 360-degree video, intercultural competence, authentic educational situations, technological competence, creativity thinking, differentiated approach, methodological competence

Introduction

The integration of 360-degree video technology, also known as spherical video-based virtual reality (Ye et al., 2021), offers a transformative approach to language education, particularly for future foreign language teachers. This technology allows for the creation and viewing of 360-degree videos using specialized cameras (Rupp et al., 2019). Such videos can be accessed through smartphones, tablets, computers, or head-mounted displays (HMD), providing a flexible and immersive learning experience. Users can control the viewing direction by moving their heads or using interactive tools like touchscreens or mouse clicks (Snelson & Hsu, 2020; Repetto et al., 2021). This immersion fosters an engaging learning environment, which is crucial for training foreign language teachers who must be equipped with the skills to facilitate interactive, student-centered classrooms.

Despite the growing interest in the use of 360-degree video in education, its impact on the development of professional competencies of future foreign language teachers, as well as its role in increasing their motivation, remain insufficiently studied. Most existing research focuses on the impact of virtual reality (VR) on students learning foreign languages and its potential to increase engagement and create an authentic language environment (Concannon et al., 2019; Chen et al., 2021). However, the impact of 360-degree video on the formation of key pedagogical competencies, including technological, methodological, and intercultural competence of future teachers, remains poorly understood.

Unlike previous studies, this study focuses specifically on the pedagogical training of future foreign language teachers, examining how 360-degree video contributes to the development of their professional skills. While existing studies (Fukuta et al., 2021; Wu et al., 2021; Kittel et al., 2019) confirm the effectiveness of VR in medicine, science, and sports, their results are not always applicable to language education. Moreover, few studies compare the impact of various VR tools on the teaching process of teachers, which leaves a gap in understanding the most effective methods of integrating 360-degree video into the educational process.

Thus, this study fills in the existing gaps by offering an empirical justification for the impact of 360-degree video on the professional development of future teachers. It not only evaluates changes in the competencies and motivation of participants, but also offers recommendations on the implementation of this technology in teacher training programs, which makes it a significant contribution to the development of foreign language teaching methodology.

Literature review

The use of 360-degree video in language teaching

Scientists recognize the 360-degree video technology as a promising tool for learning foreign languages. One of the key problems of language learning in real life is the lack of an authentic language environment (Shadiev & Yu, 2021). However, 360-degree video, as a form of virtual reality, provides an opportunity to create a realistic educational environment. This format is based on real video recordings (Snelson & Hsu, 2020), which allows students to immerse themselves in an authentic language context and feel present in a real situation (Huang et al., 2020).

Unlike traditional virtual reality based on 3D animation, which requires significant costs and sophisticated technology, 360-degree video is more accessible and easier to use. This makes it a suitable tool for teachers and students in school settings (Shadiev et al., 2024). Moreover, a number of studies have shown that teachers and students have successfully created their own content in 360-degree video format, integrating it into the language learning process (Chen & Hwang, 2020).

Despite the growing number of studies on language learning using 360-degree video, literature review of this issue remains limited. For example, the works of Chen et al. (2020) and Concannon (2019) mainly focused on language learning using immersive virtual reality based on 3D computer technology. According to Shadiev (2021) virtual reality can classified as low-immersion (LiVR) and high-immersion (HiVR). LiVR involves interacting with VR content through a flat screen using a mouse or keyboard, while HiVR requires the use of a headset (HMD) and additional controllers, providing a deeper immersion in the virtual environment.

HiVR creation technologies can include both computer-generated 3D animations and 360-degree video. These approaches vary in cost, authenticity, presence, and flexibility (Shadiev et al., 2021). In particular, 360-degree video recorded with a camera displays scenes, objects, and people as they exist in the real world, which provides a higher level of authenticity and realism. At the same time, the cost of creating it remains significantly lower compared to 3D animation.

Many users experience physical discomfort, including motion sickness, when using head-mounted displays (HMDs), with studies by Huber et al. (2017) and Taylor & Layland (2019) highlighting the impact of immersion duration on user experience. Additionally, a significant challenge lies in the limited availability of 360° educational videos, as noted by Johnson (2018) and Harrington et al. (2018), who emphasize the lack of specialized content for disciplines like medicine, restricting the full potential of this technology in education.

Furthermore, while 360° video technology may seem accessible in terms of hardware, Harrington et al. (2017) discuss the ongoing concerns regarding the costs of production and implementation, raising important questions about its long-term feasibility and effectiveness in educational settings. However, in this study, students did not report significant adverse health effects, suggesting that the duration and nature of immersion were well-balanced. Additionally, the high cost of VR technology remains a temporary obstacle, as history has shown that prices tend to decrease over time, making advanced educational tools more widely accessible in the future.

Influence on the competence and motivation development of future foreign language teachers

The use of 360-degree video in the training of future foreign language teachers helps to develop important professional competencies. First, students can develop their skills of reflection and observation by analyzing various pedagogical practices and developing their own methods of working with students. Secondly, by observing the teaching process in real-world settings, future teachers gain experience interacting with diverse students, which is key to successful language teaching in diverse classrooms (Shadiev et al., 2024).

In addition, this technology provides an opportunity to see how effectively an authentic language environment is used, allowing teachers to learn from the example of real teachers and directly adopt their strategies for their own teaching.

The Common European Framework of Reference for Languages (CEFR) defines key competence dimensions for teaching English, encompassing linguistic, sociolinguistic, pragmatic, pedagogical, intercultural, digital, assessment, and classroom management competencies. While CEFR primarily focuses on proficiency levels (A1-C2), it also highlights the importance of intercultural competence, enabling teachers to promote cultural awareness and integrate authentic materials into lessons. Pedagogical competence involves selecting appropriate methodologies and scaffolding techniques, while pragmatic and sociolinguistic competencies confirm that learners grasp discourse structure and social language norms. In the modern classroom, digital and technological competence is crucial, with tools like 360-degree video offering immersive learning experiences that enhance engagement. Teachers must also possess assessment and evaluation skills, applying CEFR-based criteria to measure progress effectively, alongside classroom management strategies to adapt teaching for diverse learners. However, traditional teacher training programs often emphasize linguistic and pedagogical knowledge while neglecting technological and intercultural competencies, which are increasingly vital in modern language education. A major gap in current teacher education is the lack of systematic integration of immersive technologies in training programs. Many future teachers obtain limited exposure to interactive, technology-enhanced learning environments, despite the growing demand for digital literacy and adaptive teaching strategies. Furthermore, the need for differentiated instruction is often overlooked, whereas 360-degree video technology can provide tailored learning experiences for students of varying proficiency levels.

The use of 360-degree video technology in the training of foreign language teachers contributes to the development of a number of key professional and pedagogical competencies that are important for a successful career in education (Table 1).

Table 1

Why are the competencies of future foreign language teachers developing so effectively after using 360-degree video technology?

Competencies	***Explanations***	***Theories***
Intercultural competence	*The 360-degree video allows future foreign language teachers to immerse themselves in real cultural contexts by observing interactions in various cultural and linguistic environments. It helps to develop the ability to understand and interpret cultural differences, which is especially important for teaching foreign languages, where intercultural interaction is an integral part of the learning process.*	***The theory of intercultural communication*** *(M. Bennett, 1998):* *This theory focuses on the individual's ability to interact effectively with representatives of other cultures, understanding and accepting their differences.*
To create authentic educational situations	*The use of 360-degree video technology helps future teachers create authentic language situations that cannot reproduced in a traditional classroom. This develops their ability to model real-world communications and learning contexts, which is an important skill for foreign language teachers, especially when organizing practical classes with native speakers or when teaching in multimodal educational environments.*	***Situational learning Theory*** *(Jean Lave, Étienne Wenger, 1991):* *This theory states that learning occurs most productively when it related closely to real-life situations. Authentic educational tasks allow students to participate in the "authentic practices" of the professional community, which promotes deep learning.*
Technological Competence	*Teachers learn to use VR technologies to create interactive and immersive educational scenarios, which helps to increase student effectiveness and engagement.*	***Technological Pedagogical Content Knowledge*** *(Mishra and Koehler, 2006). This theory explains how teachers can integrate technology into their professional practice. She emphasizes the need to combine three components: technological knowledge, pedagogical knowledge and knowledge of the content of the discipline.*
Creativity and innovative thinking	*360-degree video encourages students to analyze situations from different angles, propose new approaches and develop original ideas, which promotes the development of creative approaches and innovative thinking.*	***Theory of the Creative Process*** *(J. Guilford(Plucker, J.A,2022) Guilford conceptualized creativity as a factor within a general theory of intelligence, and in this regard, creativity was an individual ability involving divergent thinking that could developed through interaction between individuals and their environments.*
Differentiated approach to teaching	*VR technologies allow teachers to individualize learning by adapting materials to different levels of students' training and their needs. 360-degree video technology provides an opportunity to immerse oneself in different contexts (cultural, professional or educational), which allows students to take into account their interests.*	***Theory of Differentiated learning*** *(Carol Ann Tomlinson, 2000) Tomlinson argues that differentiated learning takes into account differences in students' abilities, interests, and levels of education, providing individualized approaches for each student to support their academic success.*
Methodological competence	*360-degree video provides an opportunity to simulate educational situations that include all the key elements of the system: educational material, teacher, students, and the educational environment. For example, students can immerse themselves in real or simulated classrooms, observing the relationship between these elements.*	***Theory of the systems approach (L. von Bertalanffy*** *1968****,*** *(F. Heylighen (2000) Methodological competence includes the ability to see the educational process as a system consisting of interrelated elements. The systematic approach emphasizes the importance of analyzing the structure, content, methods, and goals of learning, as well as taking into account external factors affecting the educational process.*

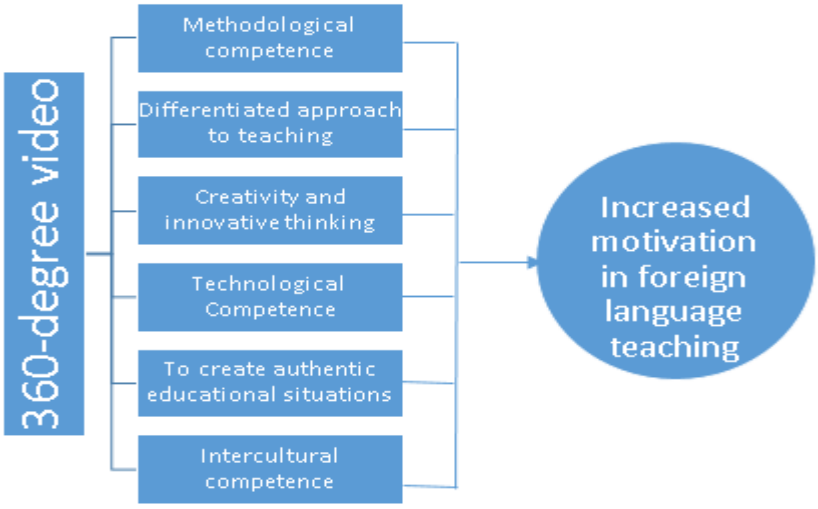
Motivation in teacher education can be lassified into extrinsic, intrinsic, and integrated motivation (Han & Yin, 2016). Extrinsic motivation is driven by external rewards, such as grades, salaries, or recognition, while intrinsic motivation stems from personal enjoyment and a sense of fulfillment in teaching. Integrated motivation occurs when teaching becomes an

essential part of an individual's identity (Deci and Ryan, 2000). VR technology primarily improves intrinsic motivation by providing interactive learning experiences, realistic teaching simulations, and autonomy in learning. Through immersive VR experiences, future teachers actively engage with classroom scenarios, practice teaching strategies, and receive instant feedback, leading to increased confidence and motivation. By developing their pedagogical, communicative, and technological competencies, their intrinsic motivation to teach increases (Mouatt, et al., 2020). This aligns with Self-Determination Theory, which highlights that motivation is strengthened when learners experience autonomy, competence, and relatedness. Thus, VR technology not only advances professional competencies but also serves as a powerful tool to foster deep and long-term motivation in future educators.

Thus, this study provides a model diagram illustrating the key competencies developed using 360-degree video technology in the training of foreign language teachers. It includes the six aforementioned competencies, grouped in such a way as to show how they support each other in the educational process (Figure 1).

Figure 1

Competency and motivation model for future foreign teachers



In this study, the hypothesis presented in Figure 1 will considered, as well as the following questions will answered:

1. How effective is 360-degree video technology for developing the competencies of future foreign language teachers?

2. Has the implementation of 360-degree video technology enhanced motivation for the teaching profession?

Methodology

Participants

The study carried out among second- and third-year students of the Eurasian National University at the Department of Theory and Practice of a Foreign Language. To conduct the research, a new optional course opened, and called "Using 360-degree video to enhance the professional competencies and motivation of future foreign language teachers." Out of the total number of students of the department (164 people), 26 volunteers participated in the study, including 24 women and 2 men. Participation in the elective course provided an opportunity for students to be acquainted with the innovative 360-degree video technology and explore its potential for professional development in the context of teaching.

Research Instruments

Meta Quest 2 (formerly known as Oculus Quest 2) is a popular virtual reality headset developed by Meta. It designed for immersive virtual worlds, gaming, learning, and various interactive experiences. It works without the need to connect to a computer or console.

The 360-degree videos used in the study taken from platforms such as YouTube and Vimeo, which provide a variety of videos in this format, including educational and cultural materials. To create a full-fledged immersive experience, the opportunity to travel to different parts of the world using Google Earth VR was also used, which allowed the study participants to interact with real cultural contexts and deepen their perception of the material

Research Procedure

The pre-test and post-test were used to measure changes in knowledge and competencies. At the first stage of the study, a pre-test was conducted, where participants assessed their professional competencies on the Likert scale, and at the end of the course, a post-test was conducted to determine changes after using 360-degree video. The questionnaire was used to study the motivation of the participants and included the Intrinsic Motivation Inventory (IMI) scale, which allowed us to collect data on the perception of technology and its impact on student motivation. The pre-test and post-test made it possible to quantify the progress of participants in the development of key competencies, and to analyze changes in competencies before and after the course, a 100-point assessment of students using the method ECTS (European Credit Transfer and Accumulation System) was used. Multivariate analysis of variance (MANOVA) was used to assess motivation after using 360-degree video, revealing significant differences between several motivation parameters. This statistical method was chosen because it allows for the simultaneous examination of multiple dependent variables while accounting for their potential intercorrelations.

Our study carried out from September to December 2024, and the study procedure shown in Table 2.

Table 2

Study procedure

Week 1	Pre-test (Initial competency assessment)
Week 2-3	The Cultural Intelligence Scale methodology
Week 4-6	Lesson design, cultural integration
Week 7-8	VR integration, lesson execution
Week 9-10	Creative tasks, engagement
Week 11-12	Differentiation, task variety
Week 13-14	Methodology, lesson analysis
Week 15	Post–test, the Intrinsic Motivation Inventory test

Week 1. There was an introduction to teaching participants' methods and tools for assessing progress in professional competencies after the introduction of 360-degree video into the educational process. To bring to an understanding what competencies can developed through 360-degree video, to teach how to assess progress in competencies, and how integrating 360-degree video can improve the quality of the educational process. Students explore examples of 360-degree video materials, discussing their potential to create immersive educational situations. In addition, a pre-test conducted to find out how well they know the above competencies using the Likert scale (from 1 to 5, where 1 is "Completely disagree", 5 is "Completely agree"). Each statement verifies one of the competencies. For example, "I can create educational materials that reflect the diversity of cultures," "I am confident that my teaching methods help develop creative thinking among students," and so on.

Week 2-3. Intercultural competence. The Cultural Intelligence Scale (CQS) methodology used to measure intercultural competence. In the initial testing (Pre-test), the participants tested using the CQS methodology, which includes 20 questions. The test assessed four components of cultural intelligence: a) the motivational component (interest in other cultures), b) the cognitive component (knowledge of cultural differences), c) the metacognitive component (the ability to recognize and correct one's behavior in intercultural situations), d) the behavioral component (the ability to interact effectively in different cultural contexts). The test results recorded for each participant in an individual protocol. After the initial testing, participants asked to watch three 360-degree videos covering various cultural contexts: traditional Japanese tea ceremony, Brazilian carnival in Rio de Janeiro, daily life and dialogues on the streets of London. The video watched in groups using VR headsets to ensure maximum immersion. Each video accompanied by an introductory explanation of its content and a post-test discussion so that participants could analyze what they saw. After watching the video, the participants repeatedly answered 20 questions of the CQS methodology. Secondary testing implemented to assess changes in cultural intelligence levels. The results obtained (before and after watching the video) compared using statistical analysis. Special attention paid to changes in each of the components of cultural intelligence. After the testing completed, a questionnaire conducted and an open discussion held with the participants. They shared their impressions of the videos they watched and answered questions about how they perceive the impact of VR technologies on their intercultural learning.

*Week 4-6. To create authentic educational situations***.** Participants watch 2-3 videos dedicated to studying in an intercultural environment (universities in the UK). During the viewing, participants take notes, paying attention to: cultural characteristics (etiquette, language, gestures, and behavior), lexical elements (phrases, specific vocabulary), and authentic communication situations. Each student developed their own lesson plan, and they were presented with a template. The students presented their ideas in small groups, received feedback, and finalized their projects. After completing the project, participants discuss what they learned from the assignment, write a short essay (200-300 words) on the topic "What did I learn in the process of developing an authentic educational situation?", "How did watching a 360-degree video help me create a lesson?".

Week 7-8. Technological Competence. The ability of a future foreign language teacher to apply 360-degree video in the educational process to achieve learning goals evaluated. The participants conducted a developed lesson fragment using 360-degree video for other students. Participants asked to choose a 360-degree video that would be the basis for an educational situation. The videos related to an educational topic (travel, holidays, daily life, and cultural peculiarities). The lessons consisted of three stages: preparatory, main and final. The participants deduced the topic of the lesson, activating the previous knowledge of the students and preparing them for the perception of the video. The participants organized 360-degree video viewing with the completion of tasks, summed up the lesson and consolidated the material they had learned.

Week 9-10. Creativity and innovative thinking. In 10-15 minutes, the participants offer as many ideas as possible on how to use the watched 360-degree video in teaching foreign languages. The students answered the following questions: a) what non-standard tasks can given to students based on videos, b) how can video used to prepare students for real-life situations, c) how do I adapt videos for different age groups. After that, the participants' ability to create creative tasks based on videos tested. The participants developed a game related to the watched video "Virtual Safari in Africa". The participants created a quiz about animals and natural conditions in Africa based on what they saw.

Week 11-12. Differentiated approach to teaching. To test the formation of skills of a differentiated approach, it is important to assess how the participant: a) takes into account the

individual characteristics of students (level of knowledge, interests, learning styles, cultural background). In addition, b) creates tasks of different levels of complexity; c) applies various forms of work (group, individual, paired); d) suggests adapting the lesson content for different categories of students. The students have developed a differentiated lesson. Their lesson planning evaluated, taking into account the diverse learning needs of students. The participants developed a lesson plan that integrates 360-degree video with differentiated tasks for: a) students with a high level of language proficiency; b) students with a low level of language proficiency; c) visual, auditory, kinesthetics; d) students with different cultural experiences. The video viewed: "360° Virtual Tour of the Louvre Museum". The following tasks were presented: a) for students with a high level: write an essay on the topic "How does art reflect cultural values?" using examples from the video; b) for students with a low level of: choose three exhibits from the video and describe them using the proposed lexical minimum ("painting", "sculpture", "color", "material"). Also, c) for visual artists: create a graphic poster with a description of one exhibit, for audios: create an audio guide to the selected museum hall, for kinesthetics: recreate one of the elements of the exposition (using improvised materials) and describe the process. In this assignment, it checked: a) the variety and adaptation of tasks, b) compliance with the level of students, c) consideration of individual preferences and abilities.

Week 13-14. Methodological competence. This part of the study improved the teacher's ability to: a) choose and apply effective teaching methods, approaches and technologies; b) develop structured lessons with clear goals, milestones and expected results; c) evaluate the effectiveness of their methods and adapt them depending on the context and needs of students. To check whether this competence improved after working with 360-degree video, the following was used comparative analysis before and after. The participants analyzed their own lessons before and after working with 360-degree videos. The participants chose two of their lessons: 1) one conducted before the introduction of 360-degree video, b) the second, created based on video. We compared the structure of lessons, methods, and assignments. They drew conclusions about how the use of 360-degree video influenced their methodical approach.

Week 15. The final stage of summing up and reflection held. It turned out that the participants learned the material and achieved the objectives of the lesson. The participants given the opportunity to summarize their knowledge, express their opinions and receive feedback, and pass the competency assessment post-test. Conditions have created for self-analysis and awareness of how competence research will affect their future teaching practice. In addition, the Intrinsic Motivation Inventory (IMI) test implemented to identify the motivation for using 360-degree videos of the participants. The Intrinsic Motivation Inventory (IMI) is a widely accepted instrument for assessing an individual’s intrinsic motivation, defined as the desire to engage in an activity driven by genuine interest or enjoyment (Ryan & Deci, 2000). Responses to the 37 IMI items were analyzed using descriptive statistics to measure central tendency (mean scores) and variability (standard deviations) across key dimensions such as interest/enjoyment, perceived competence, and effort/importance. Multivariate analysis of variance (MANOVA) used to examine group differences in motivation levels and the impact of 360-degree video on student motivation.

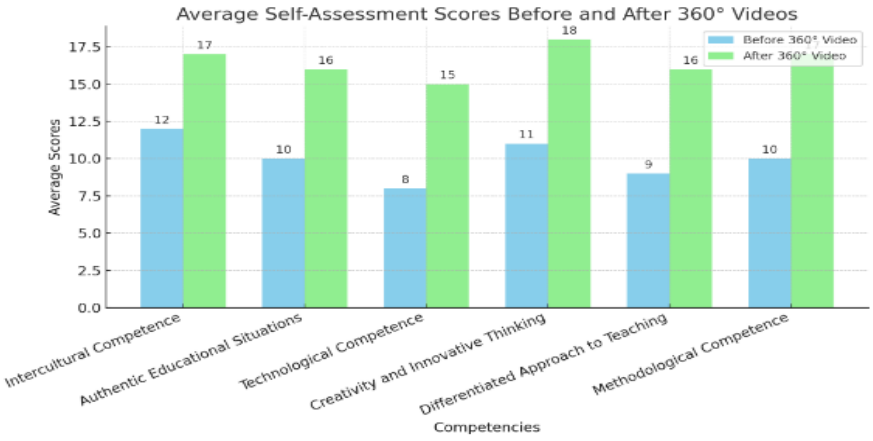
Results

Research question 1. How effective is 360-degree video technology for developing the competencies of future foreign language teachers?

Week 1. The figure below (Figure 2) showed the average self-assessment scores of 26 participants in six key competencies before and after using 360-degree video.

Figure 2

Average self-assessment score before and after 360-degree videos



For all competencies, there is a significant increase in average scores after watching the video. The largest increase observed in the following competencies: 1) Technological Competence: an increase of 7 points; b) Creativity and Innovative Thinking: an increase of 7 points. Other competencies also showed steady growth, for example, "Intercultural Competence" and "Methodological Competence" increased by 5-6 points. The participants significantly improved their competencies after using 360-degree video. This demonstrates the effectiveness of this technology for the professional development of future teachers.

Week 2-3. At this stage, the results of pre- and post-test testing compared for each component (motivational, cognitive, metacognitive, and behavioral). As well as the distribution of responses from the post-test questionnaire on the alleged effect of virtual reality on intercultural learning.

Figures 3, 4

Average scores for the four components of cultural intelligence and distribution of responses

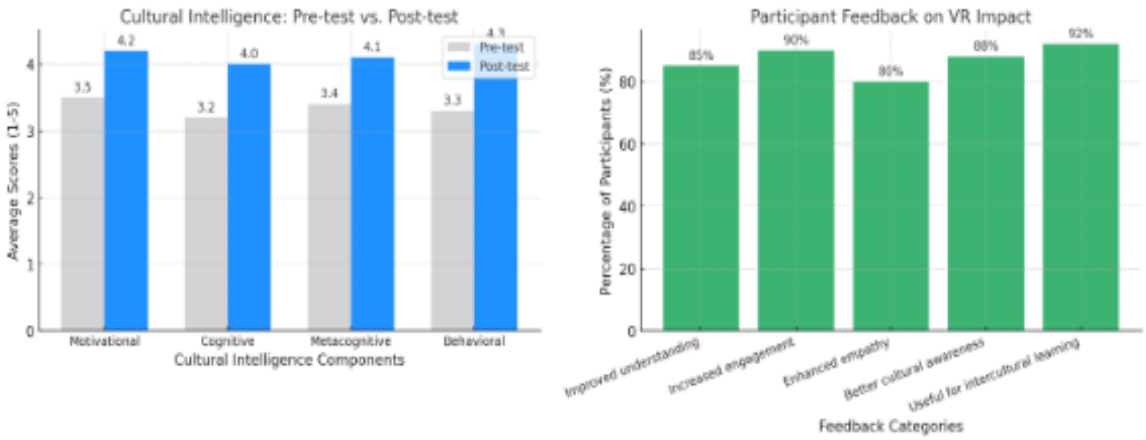
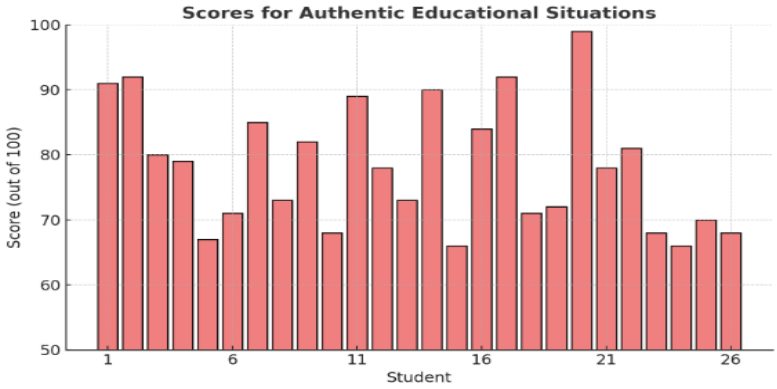


Figure 3 shows the average scores for the four components of cultural intelligence (motivational, cognitive, metacognitive, behavioral) before and after watching a 360-degree video. After testing, significant improvements were recorded in all components, with the highest result in the behavioral component (M = 4.3). Figure 4 shows the to questions about the impact of VR on intercultural learning. The largest percentage of participants noted the categories "Useful for intercultural learning" (92%) and "Increased engagement" (90%), which indicates the high effectiveness of VR in the formation of intercultural competence.

Week 4-6. The following results (Figure 5) obtained: a) the development of skills in designing authentic educational situations, b) the ability to integrate cultural and linguistic aspects into lessons, c) the ability to find and adapt materials from real intercultural contexts.

Figure 5

Scores for authentic educational situations

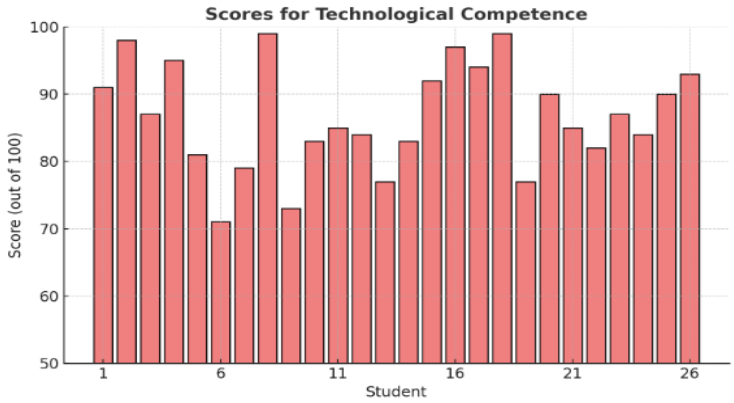


Most of the students scored 85+ points, demonstrating confidence in creating authentic educational situations. In addition, the majority of students demonstrated a high level, scoring from 65 to 99 points.

Week 7-8. This approach allowed to test how well the future teacher: a) knows how to select suitable 360-degree videos, b) develops tasks that meet educational goals, and c) integrates VR technologies into the learning process.

Figure 6

Scores for authentic technological competence



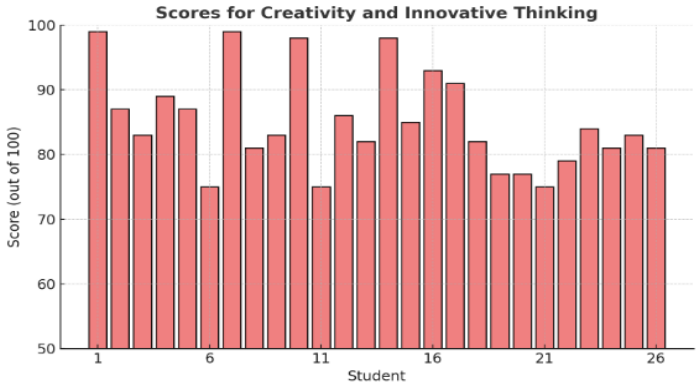
Results range from 70 to 98, showing confidence in the use of technology.

Week 9-10. The result of creativity was the ability to come up with original ideas, generate non-standard solutions for educational tasks and create creative assignments for

students, which contributes to the development of an innovative approach to learning. Innovative thinking, in turn, involves the ability to integrate new technologies, including 360-degree video, into the educational process, the development of non-standard teaching methods, and the ability to transform traditional approaches to learning, opening up new opportunities to improve the effectiveness of the educational experience.

Figure 7

Scores for creativity and innovative thinking

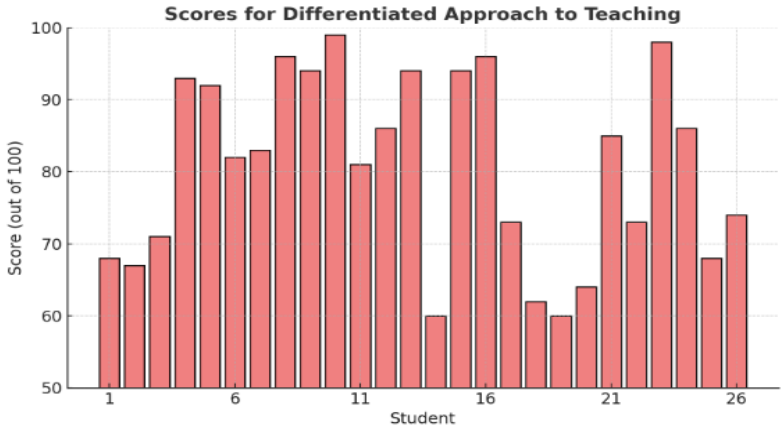


The highest scores (75-100), demonstrating the development of creativity.

Week 11-12. The results of the test of the formation of skills of a differentiated approach reflected how the participant takes into account the individual characteristics of students. Such as the level of knowledge, interests, learning styles and cultural background, and also creates tasks of different levels of complexity, applies various forms of work (group, individual, paired) and offers adaptation of the lesson content for different categories of students, thereby ensuring more effective and personalized learning.

Figure 8

Scores for differentiated approach to teaching

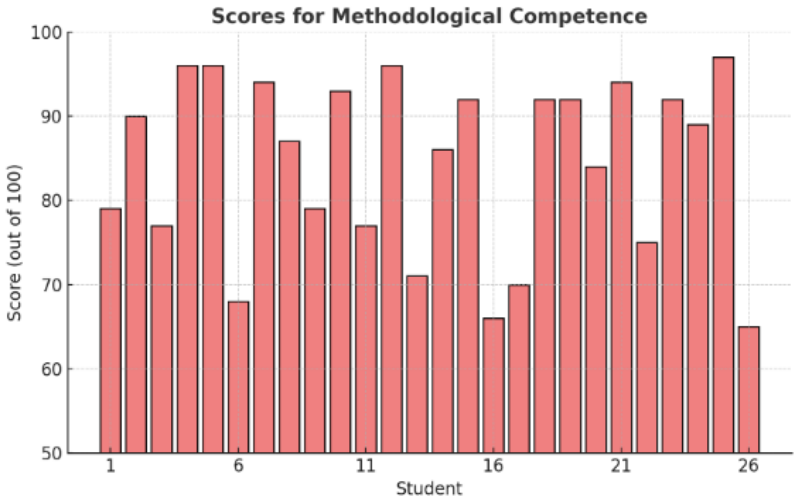


Good performance, which indicates the development of a differentiated approach to learning. The range is from 60 to 97, which indicates the advanced skills of a differentiated approach.

Week 13-14. The results of this stage, the following evaluated: a) depth of analysis, b) the ability to identify changes and improvements, c) reasonableness of conclusions.

Figure 9

Scores for methodological competence



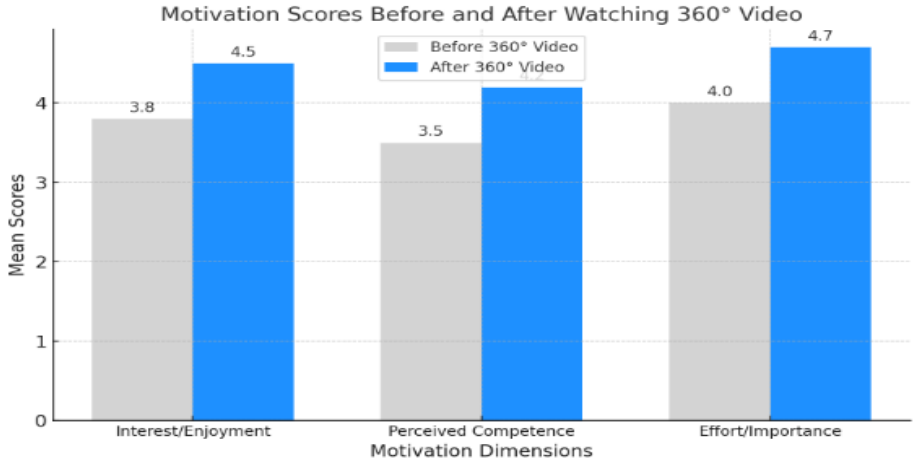
The students showed a high level of methodological skills. Results from 65 to 99, emphasizing methodological development.

Research question 2. Has the implementation of 360-degree video technology enhanced motivation for the teaching profession?

As Figure 10 showed, the average values of motivation indicators increased after watching the videos, which may indicate the positive impact of technology on participant engagement.

Figure 10

Motivation scores before and after watching 360 degree video



Motivation analysis before and after watching 360 degree videos showed a significant increase in all three parameters: interest/pleasure (up to: M = 3.8, SD = 0.7; after: M = 4.5, SD = 0.6), perceived competence (up to: M = 3.5, SD = 0.6; after: M = 4.2, SD = 0.5) and effort/importance (before: M = 4.0, SD = 0.7; after: M = 4.7, SD = 0.5). Multivariate analysis of variance (MANOVA) revealed significant differences in motivation levels before and after watching, indicating a positive effect of 360 degree video on student motivation.

Wilks' Lambda (0.76): This indicator demonstrates how much of the total variance is not explained by the differences between the groups (before and after watching the video). The

lower the Lambda value, the more pronounced the differences between the groups. In this case, 0.76 indicates a significant impact of 360-degree video on student motivation.

$F(3, 23) = 5.8$, $p < .01$:

The value of the F-statistic (5.8) confirms the presence of significant differences between the groups. $p < .01$ indicates a high statistical significance of the result (less than 1% probability that the effect is random).

Discussion

This study examined the use of 360-degree video technology for the training of foreign language teachers. The results confirmed that this innovative approach contributes to the development of key professional competencies necessary for successful teaching in a modern educational environment.

The main contribution of the research is to identify six key competencies: pedagogical adaptability, cultural awareness, classroom management skills, reflective practices, technology proficiency, and student engagement strategies. These competencies form an interconnected model, where each supports the other, which enhances the overall effect of the educational process. For example, pedagogical adaptability enhanced through reflective practices, and cultural awareness contributes to more effective student engagement.

The results confirmed the hypothesis that 360-degree video technology is a transformative medium for teacher training. Immersive content allows simulate real-world classroom situations, improving understanding of theory and its practical application. The increase in professional competence indicators demonstrates the effectiveness of technology: the greatest improvements observed in technological competence, creative thinking and the ability to adapt learning to the needs of different groups of students.

The growing intercultural competence of the participants confirms the importance of immersion in authentic cultural contexts, which corresponds to Bennett's theory of intercultural communication. The development of divergent thinking noted by the participants is consistent with Guilford's ideas about the role of new media in stimulating creative analysis.

In addition, the use of technology has contributed to the introduction of a differentiated approach, which confirms Tomlinson's theory about the importance of taking into account individual differences. The participants noted an improvement in lesson planning, which corresponds to Bertalanfi's systematic approach. The increased motivation revealed by the results of the IMI test confirms Desi and Ryan's theory about the importance of intrinsic motivation in professional development.

Thus, the study showed that 360-degree video not only increases the level of professional competencies of future foreign language teachers, but also provides them with high motivation, offering integration of theoretical knowledge and practical experience into a single educational system.

Conclusion

The conducted research has demonstrated that the use of 360-degree video technology in the training of future foreign language teachers is an innovative and effective method that contributes to the formation of key professional competencies. The development of skills such as intercultural, technological and methodological competence was most noticeable, which confirms the importance of authentic experience and immersion in real educational situations.

In addition, the 360-degree video allowed the participants to analyze the lessons from different perspectives, which led to an improvement in their ability to reflect and improve themselves. This approach is consistent with the theory of situational learning, according to which interaction with real educational contexts promotes deep learning.

The significant growth of the participants' creative and innovative thinking confirms the importance of using non-standard methods and technologies in education. The participants learned how to adapt materials for students with different levels of education, which indicates the development of a differentiated approach to learning.

In terms of motivation, the study found that using 360-degree video not only promotes professional development, but also significantly increases the internal motivation of participants. This confirms the hypothesis that the development of competencies directly related to the growth of interest in the profession.

However, the study has a number of limitations. A small sample and a short study period limit the ability to generalize the results. In addition, using specific tools such as Meta Quest 2 and certain videos can be difficult given limited resources.

Although the cost of VR headsets remains high, their advantages in language learning far outweigh the drawbacks. A similar situation prevailed in the early 2000s when many schools in Kazakhstan had little to no access to computers, making the use of laptops nearly impossible. However, today, computers are an essential part of every classroom, seamlessly incorporated into the educational process. Likewise, VR technology is anticipated to follow this trajectory, gradually becoming a standard tool in education and an integral part of daily learning.

Therefore, the study and development of VR technologies in education represent a crucial scientific endeavor with overwhelmingly positive outcomes. Further exploration of 360-degree videos and the growth of its capabilities will undoubtedly elevate language learning methodologies to new heights, enhancing engagement and effectiveness for future teachers.

For further research, it recommended to expand the sample to include students from different educational institutions, as well as to study the impact of 360-degree video on long-term learning outcomes. It is also important to consider the possibilities of integrating this technology into different stages of the educational process in order to maximize its potential.

Overall, the results confirm that 360-degree video can be a valuable tool in teacher training, contributing to the formation of the necessary competencies and motivation for successful professional activity.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

Author Contributions

Ainash Kussainova: Conceptualization, Methodology, Writing – Original Draft Preparation. Roza Zhussupova: Investigation, Data Curation, Writing – Review & Editing. Rustam Shadiev: Supervision, Validation, Visualization.

References

Bennett, M. J. (1998). Intercultural communication: A current perspective. In M. J. Bennett (Ed.), *Basic concepts of intercultural communication: Selected readings*. Intercultural Press.

Chen, C. H., Hung, H. T., & Yeh, H. C. (2021). Virtual reality in problem-based learning contexts: Effects on the problem-solving performance, vocabulary acquisition, and motivation of English language learners. *Journal of Computer Assisted Learning, 37*(3), 851–860. https://doi.org/10.1111/jcal.12528

Concannon, B. J., Esmail, S., & Roberts, M. R. (2019). Head-mounted display virtual reality in post-secondary education and skill training. *Frontiers in Education, 4*(80), 1–23. https://doi.org/10.3389/feduc.2019.00080

Common European Framework of Reference for languages: learning, teaching, assessment language policy unit, Strasbourg www.coe.int/lang-cefr

Fukuta, J., Gill, N., Rooney, R., Coombs, A., & Murphy, D. (2021). Use of 360 video for a virtual operating theatre orientation for medical students. *Journal of Surgical Education, 78*(2), 391–393. https://doi.org/10.1016/j.jsurg.2020.08.014

Guilford, J. P. (1986). *Creative talents: Their nature, uses, and development.* Bearly Limited.

Han, J., & Yin, H. (2016). Teacher motivation: Definition, research development and implications for teachers. Cogent Education, 3(1). https://doi.org/10.1080/2331186X.2016.1217819

Harrington, C. M., Kavanagh, D. O., Wright Ballester, G., Wright Ballester, A., Dicker, P., Traynor, O., Hill, A., & Tierney, S. (2018). 360 operative videos: A randomised cross-over study evaluating attentiveness and information retention. Journal of Surgical Education, 75, 993– 1000. https://doi.org/10.1016/j.jsurg.2017.10.010

Heylighen, F. (2000). Referencing pages in Principia Cybernetica Web. In F. Heylighen, C. Joslyn, & V. Turchin (Eds.), *Principia Cybernetica Web*. http://cleamc11.vub.ac.be/REFERPCP.html

Huber, T., Paschold, M., Hansen, C., Wunderling, T., Lang, H., & Kneist, W. (2017). New dimensions in surgical training: Immersive virtual reality laparoscopic simulation exhilarates surgical staff. Surgical Endoscopy, 31, 4472–4477. https://doi.org/10.1007/s00464-017-5500-6

Johnson, C. D. L. (2018). Using virtual reality and 360-degree video in the religious studies classroom: An experiment. Teaching Theology and Religion, 21, 228–241. https://doi.org/10.1111/teth.12446

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge University Press.

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mouatt, B., Smith, A. E., Mellow, M. L., Parfitt, G., Smith, R. T., & Stanton, T. R. (2020). The use of virtual reality to influence motivation, affect, enjoyment, and engagement during exercise: A scoping review. Frontiers in Virtual Reality, 1. https://doi.org/10.3389/frvir.2020.564664

Plucker, J. A. (Ed.). (2022). *Creativity and innovation: Theory, research, and practice* (2nd ed.). Routledge. https://doi.org/10.4324/9781003233923

Repetto, C., Di Natale, A. F., Villani, D., Triberti, S., Germagnoli, S., & Riva, G. (2021). The use of immersive 360 videos for foreign language learning: A study on usage and efficacy among high-school students. *Interactive Learning Environments, 1–16.* https://doi.org/10.1080/10494820.2020.1863234

Rupp, M. A., Odette, K. L., Kozachuk, J., Michaelis, J. R., Smither, J. A., & McConnell, D. S. (2019). Investigating learning outcomes and subjective experiences in 360-degree videos. *Computers & Education, 128,* 256–268. https://doi.org/10.1016/j.compedu.2018.09.015

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Snelson, C., & Hsu, Y. C. (2020). Educational 360-degree videos in virtual reality: A scoping review of the emerging research. *TechTrends, 64*(3), 404–412. https://doi.org/10.1007/s11528-019-00474-3

Shadiev R, Yu J and Sintawati W (2021) Exploring the Impact of Learning Activities Supported by 360-Degree Video Technology on Language Learning, Intercultural Communicative Competence Development, and Knowledge Sharing. Front. Psychol. 12:766924. https://doi.org/10.3389/fpsyg.2021.766924

Shadiev R., Yingying Feng, Roza Zhussupova, Yueh-Min Huang. (2024). Intercultural competence development through a tele-collaborative project supported by speech-enabled corrective feedback technology. Journal of Computer Assisted Learning. Volume 40, Issue 2, p. 697-714. https://doi.org/10.1111/jcal.12906

Taylor, N., & Layland, A. (2019). Comparison study of the use of 360-degree video and non-360-degree video simulation and cybersickness symptoms in undergraduate healthcare curricula. BMJ Simulation and Technology Enhanced Learning, 5, 170–173. https://doi.org/10.1136/bmjstel-2018-000356

Tomlinson, C. A. (2000). Differentiation of instruction in the elementary grades.

Wu, J., Guo, R., Wang, Z., & Zeng, R. (2021). Integrating spherical video-based virtual reality into elementary school students' scientific inquiry instruction: Effects on their problem-solving performance. *Interactive Learning Environments, 29*(3), 496–509. https://doi.org/10.1080/10494820.2019.1587469

Ye, X., Liu, P. F., Lee, X. Z., Zhang, Y. Q., & Chiu, C. K. (2021). Classroom misbehaviour management: An SVVR-based training system for preservice teachers. *Interactive Learning Environments, 29*(1), 112–129. https://doi.org/10.1080/10494820.2019.1579235

Zulkiewicz, B. A., Boudewyns, V., Gupta, C., Kirschenbaum, A., & Lewis, M. A. (2020). Using 360-degree video as a research stimulus in digital health studies: Lessons learned. *JMIR Serious Games, 8*(1), e15422. https://doi.org/10.2196/15422

Information about authors

Kussainova Ainash Zarkeshevna – Doctoral student, L.N. Gumilyov Eurasian National University, Astana, Kazakhstan, e-mail: kussainova.aiko@gmail.com, ORCID 0009-0008-5098-4219 ***(corresponding author)***

Zhussupova Roza Flurovna - Candidate of pedagogical sciences, Ass. Professor, L.N.Gumilyov Eurasian National University, Astana, Kazakhstan,e-mail: rozazhusupova@gmail.com, ORCID 0000-0003-1850-2052

Shadiev Rustam Narzikulovich - PhD, professor of Zejiang University, Zhejiang Province, People's Republic of China, e-mail: rustamsh@gmail.com, ORCID 0000-0001-5571-1158.