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Trainee teachers' perceptions on the use of Blender and Unity to develop 3D didactic materials for science teaching

Karla Esther Espinoza Castro | iD Universidad Nacional de Educación, UNAE-Ecuador
Evelyn Aracely Cabrera Romero | iD Universidad Nacional de Educación, UNAE-Ecuador
Diana Elizabeth Chimbo Sumba | iD Universidad Nacional de Educación, UNAE-Ecuador
Erick Eduardo Quizhpi Guallpa | iD Universidad Nacional de Educación, UNAE-Ecuador

ABSTRACT Education in Ecuador has experienced significant transformations particularly related to policy and curriculum. For example, the Common European Framework of Reference for Languages (CEFR) indicators are used in English curriculums. However, these changes do not seem to have impacted the methodology teachers use in class. In this sense, Virtual Reality (VR) has become a powerful tool to innovate education to go hand in hand with the current society and technology advancement. This study shows the pre-service students' perceptions about using the software Blender and Unity to develop 3D instructional materials to teach Science using English as the means of instruction. To examine these perceptions, the authors created and delivered a training course about using Blender and Unity to 40 pre-service students. At the end of the course, the authors administered a questionnaire to identify their perceptions concerning Unity and Blender. In general, pre-service students manifested that the course developed their skills to create 3D instructional materials. However, problems related to the characteristics of computers and access to individual devices detected pre-service students' willingness to develop 3D instructional materials.

KEYWORDS educational technology, teaching Science, virtual reality, 3D instructional resources.

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Percepciones de los profesores en formación sobre el uso de Blender y Unity para desarrollar materiales didácticos 3D para la enseñanza de las ciencias

RESUMEN La educación en Ecuador ha experimentado transformaciones significativas, particularmente en el ámbito de políticas públicas y diseños curriculares, es este sentido, un ejemplo notable es la incorporación de los indicadores del Marco Común Europeo de Referencia para las Lenguas (MCER) en los currículos de inglés. No obstante, estas transformaciones no han generado un impacto equivalente en las metodologías implementadas por los docentes en el aula. En este contexto, la Realidad Virtual (RV) emerge como una herramienta potencialmente transformadora para la innovación educativa, permitiendo a las instituciones mantenerse a la vanguardia de las demandas de la sociedad contemporánea y el acelerado avance tecnológico. La presente investigación analiza las percepciones de estudiantes en formación docente respecto al uso de los softwares Blender y Unity para el desarrollo de materiales didácticos tridimensionales orientados a la enseñanza de Ciencias, utilizando el inglés como medio de instrucción. Para examinar dichas percepciones, se diseñó e implementó un curso de capacitación sobre el uso de Blender y Unity, en el cual participaron 40 estudiantes de formación docente. Al finalizar la intervención, se aplicó una encuesta para identificar sus valoraciones sobre ambas herramientas. Los resultados evidencian que, en términos generales, los participantes reconocen que el curso contribuyó significativamente al desarrollo de competencias para la creación de materiales didácticos en 3D. Sin embargo, se identificaron factores limitantes relacionados con las especificaciones técnicas de los ordenadores disponibles y la falta de acceso a dispositivos individuales, elementos que disminuyeron la predisposición de los futuros docentes hacia el desarrollo de materiales didácticos tridimensionales

PALABRAS CLAVE tecnología educativa, enseñanza de Ciencias, realidad virtual, recursos didácticos 3D.

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kronos.idiomas@uce.edu.ec

INTRODUCTION

Education in Ecuador has experienced significant transformations in the last decades. These transformations revolve around the accessibility to education and the teaching and learning methodology, both of which favor Ecuadorians. As a result, more people can access primary and secondary education, unlike some decades ago. Regarding the teaching methodology, most teachers have been adapting their techniques and instructional resources to the demands of the current society, aiming to improve the quality and equity of the educational system. An example of these changes is evident in the reform of the Ecuadorian constitution in 2008, where education was declared a fundamental right and, therefore, free at all levels (primary, secondary, and university). In tandem with this reform, the state created quality standards and curriculum modifications at all educational levels, intending to prepare citizens who adapt to the new predominant and evolving current trends (Constitución de la República del Ecuador, 2008; Cabrera y Jerves, 2022) of the modern world.

In 2021, the Ministry of Education implemented the new prioritized curriculum for the elemental, medium, and superior sublevels of General Basic Education and high school. This modification highlighted the development of the communicational, mathematical, socioemotional, and digital competencies. With this new focus, the national authorities aimed to prepare students for the contemporary world through a holistic teaching and learning process.

Despite the government's intention to change the country's educational system, some institutions still use traditional teaching methods, mainly based on lectures, which tend to limit students' active participation, restricting the development of their critical and scientific thinking. Regarding infrastructure, an aspect beyond the teachers' influence, schools have few laboratories and few experimental and technological resources. Thus, innovative methodologies must integrate knowledge experimentation and inquiry as the cornerstone of primary and secondary education's teaching and learning process.

In this context, it is paramount to mention the importance of English in the national educational system. In Ecuador, English is taught both in private and public educational institutions. In the public system, this language is taught from year two to the last year of high school. However, despite its popularity, English language teaching in public schools faces different challenges: a lack of specialized teachers, the absence of? innovative methodologies, and continuity of learning (Murillo and Rosales, 2024). The limited number of specialized teachers reduces the effectiveness of developing the students' communicative competency, particularly in primary education. Furthermore, Torres and Estrella (2022) mention that teaching English in secondary education becomes more challenging since the number of hours assigned to teach this subject is insufficient to achieve the English level determined in the national English curriculum.

These challenges must be addressed using innovative approaches and considering the technological advances and the diversity of the teaching and learning methodologies, digital tools can help improve the learning process. Among these emerging technologies, the one that has been gaining popularity in education is Virtual Reality (VR). This technology allows teachers to create immersive environments which facilitate students' learning. In the case of English Language Teaching (ELT), VR provides students with the opportunity to immerse in real-life situations. Creating environments that help teachers simulate situations where students can interact with native speakers of English.

VR's advantages to education, particularly to ELT, are indisputable. Unfortunately, English teachers do not usually take advantage of this tool because it is perceived as challenging. However, this perception is incorrect since VR is currently based on specialized software, which, with proper training, allows teachers to create innovative teaching resources (Espinoza et al., 2022; Soutto-Ferreira, et al., 2021).

Training pre-service teachers on using these technologies prepares them to face the challenges of modern education. Additionally, integrating technological tools in pre-service education contributes to developing the necessary digital competencies in the growing technological world (Velastegui-Hernández, et al., 2024). Moreover, it allows pre-service teachers to model immersive instructional materials that can be adapted to diverse students' educational needs. These resources also facilitate learning and increase students' motivation and comprehension of abstract concepts, particularly in science. Above all, it paves the way for integrating different areas, for instance, Science and ELT, through interactive student experiences.

In this regard, the authors created and carried out a training course on using Blender and Unity to provide technological skills to future experimental Science teachers. These tools are free and allow teachers to develop interactive, tridimensional environments. Blender transforms bidimensional images in 3D models, and Unity provides functionality and motion (Hamid, et al., 2021). The objective of this course was to develop immersive digital resources to facilitate the process of teaching and learning Science.

This study examines the pre-service teachers' perceptions about the use of Blender and Unity to create 3D instructional resources for teaching Science. Through this research, the authors aim to identify the advantages and challenges of using these technological tools to construct more dynamic, inclusive, and effective pedagogical practices.

LITERATURE REVIEW

Virtual Reality

Virtual Reality (VR) is a technological system where a computer generates a digital environment. In this environment, users can interact, operate, and visualize specific activities in real time (Pimentel et al., 2023). With this technology, users can also create simulations in 3D, which combine a multisensorial experience that mixes vision, hearing, and touch to immerse users in a digital environment that simulates a physical context. Moreover, RV facilitates interaction with other users within a virtual environment (Toala et al., 2020, Espinoza et al., 2022).

Virtual reality's capacity to submerge users in digital environments is connected to the concept of immersion. According to Pérez et al. (2021), this refers to the generation of the perception of a physical presence in a world that is not real. According to the degree of immersion, there are three levels of VR, namely, *a*) *non-immersive,* where users interact with the virtual environment using a monitor of a computer, a mouse, and a keyword; *b*) *semi-immersive,* where the visualization of the digital world is done through VR goggles; and *c*) *fully immersive* when the users interact with the digital environment through the use of specific devices such as VR gloves, VR shoes, VR headsets among other devices which amplify the users' sensorial experiences.

Virtual Reality in Education

In the educational field, VR has become a tool that has allowed teachers to enrich and reinforce their teaching and learning processes in the last decade. Its implementation favors the development of students' creativity, motivation, and interests. Additionally, VR facilitates the comprehension of abstract concepts and enhances the development of technological and cooperative skills (Elias et al., 2021). This way, VR positively influences students' academic performance, allowing teachers to create interactive and immersive experiences.

Experiences that actively involve students and stimulate the development of critical thinking, problem-solving, and creativity.

VR can transform existing educational models, integrating theory and practice by creating immersive student learning experiences. It also helps overcome the geographic barriers of learning by offering students access to 3D replicated objects from different places. This widens students' learning opportunities in global contexts (Sousa et al., 2021). Teachers can use VR to create the same activity in different languages, adjusting to students' specific needs in tandem with the diverse educational contexts. Time also does not become an impediment since, through VR, teachers can recreate historical scenarios in different époques, amplifying the students' capacity to assimilate knowledge (Magallanes et al., 2021).

Virtual Reality in English Language Teaching

VR has emerged as an innovative tool in ELT because it allows students to interact in digital environments that simulate situations where real communication exchanges occur. When English teachers use VR, they facilitate the development of linguistic skills, particularly oral comprehension and speaking fluency, since they can situate students in different interactive contexts where they practice the language in a natural and pertinent manner (Ordóñez-Proce et al., 2023). Practicing English in natural contexts increases students' confidence and reduces their anxiety when using the language with others.

When teachers incorporate VR in their language classes, there is a high student acceptance rate since it adapts to their interests and expectations (Agurto y Guevara, 2023). According to Moreno and Galván (2020), VR enhances active and collaborative methodologies that increase students' participation and engagement. Similarly, Pérez-Barioluengo et al. (2024) add that this technology contributes to developing the students' technological competencies, increasing their learning commitment. Since teachers are moving from a traditional memorization method to more interactive and immersive learning experiences, students retain their knowledge and improve their grades in English.

To take advantage of the VR benefits, combining VR knowledge, teacher training, and the application of innovative teaching methods to achieve significant learning and, in the case of English, the development of linguistic competency is paramount.

Virtual Reality in Teaching Science

In the teaching context, Science is a subject that revolves around teaching and learning natural phenomena using English as the means of instruction. Turpo-Gebera and Gonzales-Miñán (2020) mention that Science refers to the «science of doing» based on exploring and identifying natural processes using a scientific approach to create regulated and controlled natural scenarios. However, teaching Science faces different challenges.

According to Valenceja (2021), Spanish-speaking students have difficulties in these classes due to the linguistic barrier since this subject is taught in a different linguistic code. Furthermore, Robles (2021) adds that the standard methodology used in Science is a lecture, which promotes temporal learning based on memorization that limits the comprehension of content and knowledge application. Pérez and Martínez-Aznar (2020) highlight that to learn this subject effectively, it is necessary to incorporate experimental and contextualized activities connected to reality where students can visualize and manipulate knowledge. In these regards, VR helps teachers make the teaching and learning process in Science more effective because they can generate dynamic and visual environments. Environments that promote students' interaction with their peers and their teachers. Teachers who infuse VR into their teaching practice can integrate different elements that reinforce the theoretical content from an experimental approach.

Concerning the target language, Science teachers can present the information to their students in English in a contextualized and interactive manner, primarily using technical and scientific vocabulary pertinent to the Science content. In this sense, VR bridges the gap between traditional and innovative methods, transforming students' learning experiences by making them more immersive and interactive.

Challenges of using Virtual Reality in Education

The implementation of VR in education poses challenges that need to be faced by education stakeholders to plan effective strategies for its proper application in educational institutions and minimize the adverse effects that changes of this nature can bring.

The VR faces problems involving physical and technological infrastructure, internet access, and a lack of technological competencies among teachers. Physical and technological infrastructure refers to the availability of enough space for students and classrooms and technological devices, such as computers and peripherals. Proper and stable internet access is fundamental so VR systems can operate without problems. Finally, the technological competencies are necessary to adapt and apply the right educational applications and platforms (Crespo et al., 2024). Another challenge of using VR in education is the one mentioned by Morales-Cadena et al. (2024); they highlight that one of the main challenges is the lack of investment in technological devices needed for correctly using VR. Thus, it is necessary that stakeholders try to look for enough funding so their educational institutions can benefit from the advantages that VR can offer to innovation in education independently of the student's socioeconomic context.

Beyond the mentioned challenges, another problem is that some teachers resist adopting innovative methodologies in their teaching practices and prefer to maintain the traditional teaching methods with which they are more familiar. As regards data protection, teachers must be aware of data management and take the necessary actions to protect this information (Peña y Cuzco, 2023).

The role of teachers in Virtual Reality

To properly infuse VR in education, the teacher's role is fundamental in all stages, for instance, in the design, development, and application of VR. Lerma et al. (2020) mention that VR is an innovative didactic tool. However, teachers must be qualified for its application. Teachers' capacity to adapt to the pedagogical demands and their flexibility to use the emerging technologies are key factors for an effective practical integration of VR in teaching and learning.

García-Herrera and Guevara-Vizcaíno (2024) coincide that VR is a facilitator of change and is presented as a revolutionary resource that enhances a transformation in the teaching and learning process. Thus, teachers must be familiar with the resources and contents pertinent to VR. The teachers also need to know the technical use of the VR resources and can use them to create practices that enhance the development of cognitive, critical, and collaborative skills.

VR activities design must be related to the effective transformation of knowledge and teaching methodologies. For this reason, teachers must combine pedagogy with technology. In this sense, during the planning stage, teachers must consider students' academic and linguistic level, the contents to teach, key concepts, learning theories, and students' special needs. Including these elements allows teachers to optimize VR's potential as a pedagogical tool (Angulo et al., 2023).

METHODOLOGY

This study aims to answer the following research question:

RQ: What are the pre-service students' perceptions of using Blender and Unity to develop 3D instructional materials to teach Science?

In order to answer this question, the authors organized a training course on using Blender and Unity to model 3D human organs to teach Science. The course consisted of six instruction hours for four weeks and was offered to pre-service students. The content of the course was: a) anatomic modeling and texturization to create 3D human organs, b) exporting 3D models from Blender to Unity, guaranteeing correct materials transfer and texture, c) developing interactive animations in Unity to simulate biological behavior (expansion, contraction and turning) through animator, d) implementing particles systems to represent biological effects, e) acknowledging the advantages of Blender and Unity software to teach Science. Furthermore, the authors delivered the course using the institutional MODDLE platform.

After finishing the course, the authors designed? and applied a survey to capture the pre-service students' perceptions about using Blender and Unity to develop 3D instructional materials to teach Science. A survey is defined as a quantitative research method composed of items aiming at drawing responses from a population or a sample (Aarons, 2020). This specific survey aimed to analyze how pre-service students perceived the effectiveness of using Blender and Unity to develop instructional resources to teach Science.

Following the survey design, the authors constructed a questionnaire comprising fourteen items grouped in three sections. The first section aimed at exploring the characteristics of the participants; the second examined the extent of the methodology of the training course to understand Blender and Unity; the third students' overall satisfaction with the resources used in the training course.

Two of the fourteen items were multiple choice, and a Likert scale was used for the twelve remaining items. The objective of this scale was to provide respondents the opportunity to rate their satisfaction and usability of Blender and Unity in developing instructional materials.

When the questionnaire draft was finished, the authors had it validated by two experts. In general, they did not suggest structural changes. Their comments mainly referred to the wording of some items, being more concise when writing the items, and avoiding using technical words to facilitate the respondents' comprehension. Henceforth, the authors accepted the experts' comments and piloted the instrument.

The authors piloted the questionnaire with eleven pre-service students. These respondents had the same characteristics as the actual respondents but did not answer the final questionnaire. The data from these eleven students was coded, and using the JASP software, the authors computed the Cronbach's alpha coefficient to measure the reliability (internal consistency) of the questionnaire. The value obtained was 0.841, meaning the instrument had a good consistency. To do a deeper analysis the authors computed the individual item's reliability; the results are presented in Table 1.

Table 1. *Individual Item Reliability*

Item	Cronbach's α
Type of high school	0,864
Did you use your computer in the training?	0,841
Do you think your computer's performance when using blender was optimal?	0,851
Did your computer's technical specifications allow optimal performance of blender and unity during the workshop?	0,880
Did the blender and unity workshop draw your interest and encourage you to actively participate in the proposed activities?	0,825
Do you feel you had the necessary prior knowledge and basic technical skills to use the software in the workshop?	0,824
was it easy to understand the basic functions of blender and unity?	0,831
Do you think the organization of the lessons facilitated a clear and effective understanding of the content?	0,845
Do you think the role played by the researchers during the workshop was appropriate to optimize learning?	0,817
Were the answers or solutions provided by the researchers clear and did they help resolve the questions raised during the workshop effectively?	0,802
Did the workshop allow you to acquire the skills necessary to create 3d educational resources in blender and unity?	0,799
Are you satisfied with the teaching resources used in the workshop?	0,796
Do you think your personal characteristics (training, technological resources, skills) influenced how you perceived the workshop's effectiveness?	0,801
Would you be interested in participating in future workshops to further your learning and use of blender and unity?	0,805

Table 1 shows the results of the Cronbach's alpha coefficient computed per each item. The majority of the items showed good consistency, considering that the values were higher than 0.8. Only items 11 and 12 showed an acceptable consistency. Based on these results, and considering the results of most of the items, the authors administered the questionnaire to the forty students who attended the training course using Google Forms.

RESULTS AND DISCUSSION

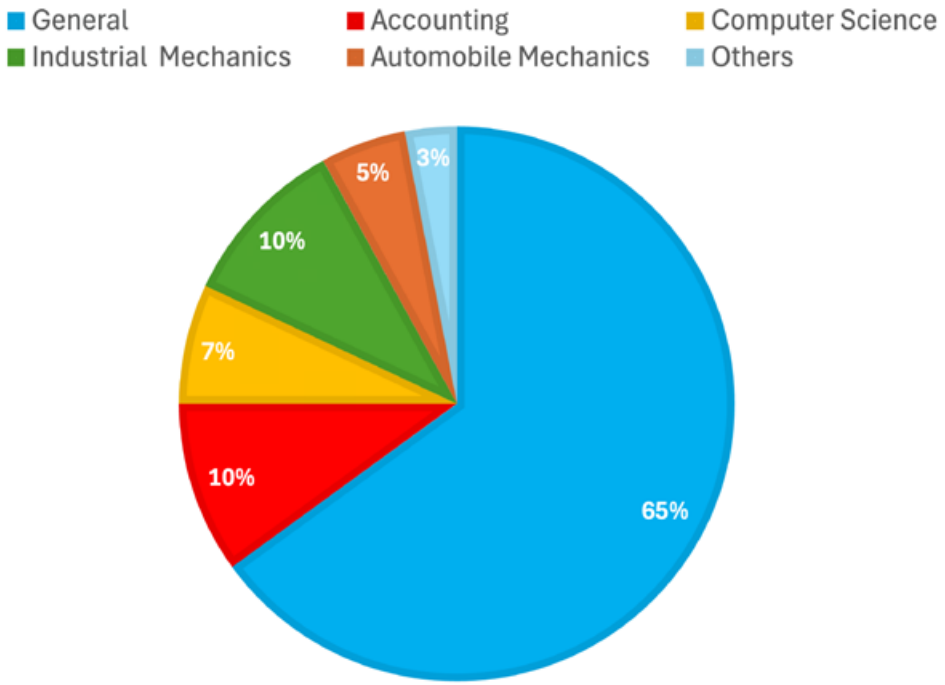
The authors used the software JASP to conduct the statistical analysis using the questionnaire data. To present the results in this section, the authors grouped them in three sections as follows.

Participants Characteristics

The forty participants who attended the course were pre-service students enrolled in third semester of the Education in Experimental Sciences Undergraduate Program in a public university. These students come from different types of high schools. In Ecuador, there are two types, general high school [Bachillerato General Unificado] where all students finish their secondary studies with general knowledge, and technical high schools where students specialized in a technical profession, for instance, mechanics.

Students access university teaching undergraduate programs regardless the high school diploma they have. This results in a variation of students' existing knowledge when they attend university, as shown below in Graph 1.

Graph 1. High School Diploma of the Pre-service Students



Graph 1 shows that most participants (65%) come from general high school [Bachillerato General Unificado]. This means that, in theory, they have almost the same general knowledge. Or at least they have received the same academic content in their high schools. Opposite to the 35% of participants from technical high schools, whose knowledge is more in the technical areas than Sciences in general.

To use Unity and Blender, participants must have basic knowledge of how computers operate and a personal computer which must not be basic. The inconvenience with a basic computer is that these two programs are too heavy to run properly in these devices. For example, the operating system needs to be minimum Windows 10, Big Sur 11 for Mac OS or Ubuntu 24.04, and a minimum RAM of 8 GB to avoid problems using Unity and Blender. In this sense, 42,5% of participants mentioned that they did not have issues with their computer performance. Whereas the remaining 57,5% mentioned their work with the software was affected.

During the course, 60% of pre-service students owned a computer. The rest shared one with their classmates or borrowed one from friends or family. This limited the pre-service students' time to practice autonomously outside the classes. About the technical characteristics of the computers, 60% of participants mentioned that their devices met the requirements for installation and work with Unity and Blender. On the other hand, 32,5% stated that their computers worked adequately on some occasions, and 7% mentioned that their computers did not allow them to work on the course due to their technical limitations.

Participants' Satisfaction with the Methodology Used in the Training Course

To measure the level of satisfaction with the training course, the authors used a Likert scale with five options as follows: a) strongly agree, b) agree, c) neither agree nor disagree, d)

disagree, and e) strongly disagree per each item. The participant's selections are shown below in Table 2.

Table 2. *Participants' Satisfaction with the Course*

Items	1 (%)	2 (%)	3(%)	4(%)	5(%)
The training course increased Interest and active participation	25	42,5	22,5	5	5
It was not difficult to understand the basic functions of Unity and Blender with the instructor's explanations	22,5	35	35	7,5	0
The curriculum organization was clear, and the sequence helped achieve the learning outcomes	25	55	20	0	0
The instructors answered all my questions and concerns about the use of Unity and Blender effectively	30	55	12,5	2,5	0
The course helped participants develop their skills in modeling 3D instructional materials	30	47,5	22,5	0	0

* Strongly agree= 1; agree = 2; neither agree nor disagree = 3; disagree = 4; strongly disagree = 5

Table 2 shows that pre-service students were generally satisfied with the training course. Particularly with the instructors, 30% of participants strongly agreed, and 55% agreed that the instructors solved their questions and concerns about using Unity and Blender. This is a crucial aspect to consider since the instructors are the ones that define the effectiveness and quality of the course. Also, they need to be very knowledgeable of the content since they must solve all their students' doubts and concerns that emerge in all teaching and learning processes. Moreover, when Science is the «science of doing» (Turpo-Gebera and Gonzales-Miñán, 2020). Science and the English linguistic competency are understood and developed through the implementation of practical activities that resemble real-life scenarios.

The second aspect of the training course that participants valued was the organization of its curriculum; 25% of participants strongly agreed, and 55% agreed with this aspect. This shows the significance of a well-organized and contextualized curriculum in achieving learning outcomes. VR is an innovative tool in teaching; however, to make the most of it, teachers need to know how to use it (Lerma et al.,2020). Well-qualified teachers can develop quality interactive resources using VR.

Apart from the technical knowledge, participants needed to develop their skills to model the instructional materials in 3D. This course was also successful; 30% of participants strongly agreed, and also 47,5% agreed. This high percentage of pre-service teachers agreeing that they have developed their skills to develop instructional materials in 3D shows the effectiveness of the course. However, 22.5% of participants exhibited indifference (neither agree nor disagree) in this facet. These results can be connected to the limitations and performance of the participants' computers, as explained in the previous section. These limitations can also be connected to the participants' difficulties in understanding the essential function of Unity and Blender where 35% of pre-service teachers chose the option neither agree nor disagree. In the same vein, 35% selected the same choise (neither agree nor disagree) regarding their interest and active participation in the course. These late results can also be linked to pre-service teachers' limitations with their computers.

Satisfaction with the Resources Used in the Course

The four authors were the instructors of this course, and the instructional resources they used were interactive presentations, instructional videos, and the software Blender and Unity installed on their personal computers. Except for the software, all resources were uploaded on the MOODLE. To measure the level of satisfaction with the resources used in

the training course, the authors used a Likert scale with five options as follows: a) strongly agree, b) agree, c) neither agree nor disagree, d) disagree, and e) strongly disagree per each item. The pre-service teachers' selections are shown below in Table 3.

Table 3. *Participants' Satisfaction with the Course*

Items	1(%)	2(%)	3(%)	4(%)	5(%)
The resources used in the training course facilitated the understanding of Unity and Blender	35	40	20	5	0
The access to the resources and the pre-service teachers' level of technical knowledge helped them understand the use of Unity and Blender	20	60	15	5	0
The resources helped develop pre-service teachers' skills in using Unity and Blender regardless of their previous knowledge	40	42,5	15	2,5	0

* Strongly agree= 1; agree = 2; neither agree nor disagree = 3; disagree = 4; strongly disagree = 5

Table 3 shows that the resources used in the training course were effective and well received by the pre-service teachers, helping them achieve the learning outcomes. For instance, 35% of participants strongly agreed, and 40% agreed that the resources used by the authors facilitated the understanding of Unity and Blender. The remaining 20% showed indifference (neither agree nor disagree) to the resources, which can be explained by the pre-service teachers' limitations have with accessing computers and the technical limitations of some computers. Concerning the access to the resources and pre-service teachers' technical knowledge, 35% of participants strongly agreed, and 40% agreed that they could access the resources without any complication. The ease of access to the resources can be the result of the use of MOODLE since the resources are available to students at any time. Furthermore, it is important to mention that the accessibility to resources and its quality bridged the gap between existing technical knowledge of some participants and the new acquired knowledge of the rest of the pre-service teachers. This was also reinforced when the 40% of participants strongly agreed and 42,5% agreed that the resources used in the course helped them develop their skills Unity and Blender regardless their previous knowledge in this area.

The general course participants' agreement that the training course was effective and allowed then to improve their skills in the modeling instructional resources in 3D is key. Hence VR has become a driver of change which is paving the way for revolutionary changes in education (García-Herrera y Guevara-Vizcaíno, 2024), it is necessary that teachers construct these types of instructional resources and use them in their classes. Particularly in teaching Science because it allows students to be immerse in different environments where they can combine learning scientific content and, at the same time, develop their English linguistic competence.

CONCLUSIONS

The current society is experiencing change due to technological development and globalization. Thus, teachers need to adapt to these changes and use new methodologies that go in tandem with the demands of the modern society. In this sense, Virtual Reality is fundamental in helping teachers create innovative 3D instructional materials. VR has the potential to immerse students in interactive scenarios that resemble reality and favors learning Science in English.

Creating 3D instructional materials requires teachers to have knowledge and technical skills in Blender and Unity. For this reason, training teachers in this area is fundamental. This study shows that pre-service students value VR's potential for teaching Science in English, and they recognize that training develops their skills regardless of previous knowledge. However, it is important to consider that teachers need computers with specific characteristics that allow Unity and Blender to run correctly. Therefore, the availability of updated devices is a must, which, on the other hand, may become a disadvantage in case teachers cannot access these devices.

CONTRIBUTOR ROLES

Karla Espinoza: Conceptualization, methodology design, results analysis and description, graph creation, original draft writing, review and editing, final manuscript preparation.

Evelyn Cabrera: Literature review, data collection, introduction writing, review and editing, formal analysis.

Diana Chimbo: Literature review, data collection, survey design, conclusions writing, and editing support.

Erick Quizpe: Literature review, data collection, survey design, conclusions writing, and editing support.

ETHICAL IMPLICATIONS

The authors state that there are no ethical implications.

CONFLICTS OF INTEREST

The authors declare that there are no financial and non-financial conflicts of interest that could have influenced the work presented.

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