

Content Analysis on the Effectiveness of Using Virtual Reality in Foreign Language Learning

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ABSTRACT

The prevalence of implementing virtual reality in foreign language education in the recent years has attracted language learners' interests and provided them with extremely conducive technological learning environment. The primary objective of the current research article is to analyse the most recent studies carried out on the effectiveness of virtual reality on foreign language education. For the sake of the study, 20 peer-reviewed published papers conducted between 2019 and 2022 were carefully selected. The meta-analysis of the studies targeted four paramount research components: (1) data collection method, (2) sample size, (3) research design and (4) language skills. The results of the analysis revealed that mixed-method was the most employed approach and undergraduate groups with a sample size of 1–50 most prevalently selected. For the sake of data collection, 40% of the related studies employed questionnaires to gather the data. Moreover, 30% of the studies investigated the impact of using virtual reality in improving English vocabulary. Thus, this content analysis study recommends addressing other language skills, i.e. receptive and productive.

Key words: Content Analysis, Virtual Reality, Foreign Language Education

INTRODUCTION

Content analysis (CA) is a method that assist to comprehend the content messages of the images, symbols, text or audio data (Gheyle & Jacobs, 2017). It is a systematic approach that recapitulates a manuscript into fewer categories of content depending on obvious coding rules (Berelson, 1952; GAO, 1996; Krippendorff, 1980; and Weber, 1990). According to Cohen, Manion, and Morrison (2002), CA is the procedure of reporting and summarizing transcribed data and the essential contents of this data. Thus, CA research could be quantitative or qualitative. While the quantitative CA concerns with measuring and counting, qualitative CA focuses on understanding and explaining. Quantitative content analysis is a research method that categorizes and records features of textual, visual, or aural material so that they can be analysed (Coe & Scacco, 2017). However, the subjective clarification of the text data via the systematic categorization procedure of recognising and coding types or themes is the goal of qualitative CA (Hsieh & Shannon, 2005).

According to Cohen et al. (2002) CA includes four processes, namely coding, categorizing, comparing and concluding. Classifying and labelling data to recognize various themes and their relationship is the essential aim of coding. Additionally, categorization is a key element of CA in which researchers attempt to gather samples examined in the data into significant categories or components (Given, 2008). This can be achieved by combining the previous grouped

codes. Making links between categories is referred to as comparing. The term “concluding” refers to framing theoretic conclusions based on the text and the findings of the analyses (Cohen et al., 2002).

In CA studies, reliability and validity are essential concepts utilised to assess the quality of research to know whether a specific approach is well used or not. Reliability is a significant factor in CA, particularly when it comes to human coding. Thus, the result of coding should be replicable and unchangeable especially when various people are given specific coding patterns (Gheyle & Jacobs, 2017). Reliability in the CA, on the other hand, includes three standards: stability, reproducibility and accuracy. According to Stemler (2000), stability is when the coders re-code the equivalent data consistently in a similar method over some time. Reproducibility is the similar text being coded in a similar classification by various people. Accuracy concerns the extent to which a text's classification relates to a standard or statistical norm. In CA, validity is the extent to which a measuring procedure represents the intended concept (Gheyle & Jacobs, 2017). Validation of inferences based on data from a single analytic method necessitates the use of several sources of data.

As this research is CA research, it could be reliable. This is because the CA can be replicated simply by other people, as all analysed articles are available and can be repeatedly analysed. Moreover, the CA may not be valid as it could include some personal interpretation, which may influence the conclusion validity.

Recently, technology has become an essential tool used to improve life systems and create an active environment. Among these technology tools, a novel one called virtual reality (VR, henceforth) technology. Fassi et al., (2016) defines VR as

a computer technology that gives the illusion, to those who use it, of being immersed in a virtual environment that does not really exist. Moreover, VR is a computer simulation of a real situation where the human subject may interact with the virtual environment, sometime by the means of non-conventional interface like glasses and helmets on which the scene is represented and the sounds reproduced (p. 140).

VR creates an actual atmosphere, which is causing many people to incorporate and interact with it. Additionally, VR technology is one tool that has a noticeable ability to enhance the education process. According to Andujar and Buchner (2019) VR has become a source that could provide an unlimited impending as a component for educational goals. Educators have realised that VR has pedagogical potential because of its potential educational applications and immersive space for learners (Savin-Baden, 2010). Thus, virtual worlds have massive pedagogical benefits and great influence on language learning (Peterson, 2006). In addition, VR has the potential to bring authenticity to a learning environment. VR provides students with the potential to experience authentic sites within the immersive environment (Andujar & Buchner, 2019), which increases their desire to learn. This paper employs content analysis approach to analyse the most recent articles on the implications of VR in foreign language learning from 2020 to 2021.

LITERATURE REVIEW

The Concept of Virtual Reality

VR is a novel approach that can be used in English language classrooms. Researchers proposed various definitions to describe virtual reality. According to Achille, et al., (2018) VR is a computer technology that brings imagination to individuals who utilise and immerse it in a virtual atmosphere. VR is a computer imitation of an actual condition where the individual may communicate with the virtual environment (Achille, Fassi, Mandelli, & Fiorillo, 2018). In addition, VR generates a comprehensive artificial virtual atmosphere through comprehensive virtualisation (Hein, et al., 2021). VR is developing and extremely encouraging technologies for education. Moreover, VR is A computer-generated simulation technology of a three-dimensional image or environment that accentuates the presence (Steuer, 1992). VR attracts the attention of learners and educators to improve the education process. Furthermore, using a model of the real world produces an immersive three-dimensional spatial atmosphere with a great level of authenticity (Lorenzo, et al., 2019). According to Lan and Grant (2021), VR is a collection of sounds and pictures invented by a technology tool to create a situation that makes a person part of it. Additionally, Kaplan and Haenlein (2010, p. 3) state that VR is ‘a computer-generated three-dimensional virtual space experienced through standard audio-visual equipment.’

Virtual Reality in Foreign Language Learning and Teaching

As far as language education is concerned, VR is considered one of the evolving technologies that can encourage learners in the process of learning a novel language. The academic community has analytically collected outcomes of VR research to achieve a superior comprehension of how a particular technology encourages education programmes (Parmaxi, 2020). Using VR to learn language skills could reduce imprecise ideas and encourage authentic imagination, which is a crucial factor in improving learners’ comprehension. For example, Van Der Schoot, et al., (2008) found that creative imagination assisted readers’ comprehension of a condition model and their understanding of the different dimensions of a narrative. This could also provide students with an opportunity to improve their writing skills in terms of their creativity and generation of ideas (Xu, et al., 2011). Thus, motivating language students through a VR learning environment may encourage in-depth comprehension, which may result in long-term memory retention. This is an effective way to acquire a foreign language competency. Alfadil (2017) found that using a second-life world when teaching English was an efficient tool for improving the vocabulary of language learners and that VR simplified the teaching and learning process. Using VR in the learning process could help in evolving cognitive attitudes, such as comprehension and various affective aptitudes like how to respond emotionally to stressful conditions (Jensen & Konradsen, 2018). By implementing VR in language learning, the rate of learners’ success will increase (Munafo, et al., 2017). Communication skills could be improved when VR technology is involved in the learning environment (Olmos-Raya et al., 2018). Additionally, experimental results have shown that utilising VR could have a massive effect on enhancing learners’ imagination (Hu, et al., 2016). Researchers have found that most learners could experience greater enjoyment through the application of VR in writing skill learning (Pack, et al., 2020). According to Ferguson, et al., (2020), the VR environment helps to increase students’ retention by using narrative games. Thus, learners can have a high retention of story content that improves their skills in language learning, such as reading and new vocabulary. As VR has played an obvious role in enhancing learning procedures, especially in learning a new language, many language teachers are expected to educate their students in higher education with the help of VR technologies (Lin & Lan, 2015). Learning a novel language means students will have an intercultural understanding that exceeds geographical boundaries without leaving their countries or even classrooms, and VR provides an opportunity to ease the acquisition of language as it has great features (Chen, et al., 2021). Learners can achieve a greater level of interaction in the learning environment via VR, which will motivate students and encourage collaborative learning (Wang, et al., 2018). VR can offer learning opportunities for dynamic procedures and repeated practice to encourage the acquisition of related expertise and abilities (Alfadil, 2020).

Virtual reality assists enhancing education and teaching by offering learners wit unforgettable memories that take

place in a classroom. Implementing this technology would inspire students and enable them to interact effectively with their peers as they determine new destinations and experience while they are inside the classroom and monitored by their teachers. It also ensures that most learners, if not all, could have the same opportunity to join the experience and share their thoughts by using this technology. Teachers have the opportunity to be creative in teaching their students as they can tailor a lesson by using VR that attracts students and help them to reflect on their experience in an efficient way. Additionally, VR contributes to offering various approaches in teaching that increase students' motivation and encouragement to learn such as collaborative language learning, role-playing, and solving problems.

FINDINGS AND DISCUSSION

As mentioned previously, the primary objective of the current research article is to analyse the most recent studies carried out on the effectiveness of VR on foreign language education. In order to collect the data, 20 peer-reviewed published papers conducted between 2019 and 2022 were carefully selected and analysed based on four paramount components: (1) data collection method, (2) sample size, (3) research design and (4) language skills. In this section, the results of the study will be tabulated and discussed.

Table 1 reveals the approaches used in the articles and the quantity of reviewed studies using those approaches. Most of the articles (50%) used a mixed-method approach, while 30% used quantitative and 10% used qualitative analysis.

Table 2 shows the samples examined in the papers. Most of the authors (40%) selected undergraduates to be the sample population in their study with, while 20% of the studies used an elementary school sample. For the sample size, the most frequent sample size used in the studies was 1–50 at 60%, and a sample size of 51–100 was the second highest (30%).

Table 1. The research strategy of the studies

Research Methods	N	%
Quantitative	6	30
Qualitative	2	10
Mixed	10	50

Table 2. The sample group and sample size

Target population	N	%
Undergraduate	8	40
Elementary	4	20
Intermediate	1	5
Upper-intermediate	2	10
Sample size		
1–50	12	60
51–100	6	30
101–150	1	5
151–200	0	0
More than 200	1	5

Table 3 displays the tools used to collect data. Most of the studies used questionnaire and interview in their studies to get precise outcomes with (40%) and (30%) respectively.

Table 4 indicates the target skill of second language learning examined by the articles' authors that could be enhanced while using VR technology. Most of the studies measured the improvement oral proficiency in second language learning at 35%. However, vocabulary comprehension was the second most frequently examined skills, at 30%. Reading and writing skills and listening comprehension were the next most prevalent with 10% and 5%.

As stated earlier, the results revealed that the majority of the studies used a mixed-method approach. According to Byrne and Humble (2007), mixed methods can counteract some of the drawbacks of certain approaches and can offer clarifications for apparently inconsistent outcomes that appear from using diverse approaches. Regarding the focus group and sample size, most of the studies focus on undergraduate groups with small sample sizes in the 1–50 range. Focusing on this educational level in the studies may have been due to undergraduate learners having more self-regulatory learning abilities and the ability to experience the full benefits of this technology (Korkmaz, 2015). However, focusing on this group could threaten the external validity. Additionally, the small sample size could generalise the findings.

A number of studies show how VR can have a positive effect on FL learning. For example, according to Soto, Ocampo, Colon, and Oropesa (2020), VR is ideal for enhancing the different skills of an FL due to the immersive focus, considering different contexts and thinking of the development of communicative skills and interaction with native speakers in higher education. In addition, VR may boost students' self-efficacy and enhance creative thinking, increase learners' interest in FL learning and enhance listening comprehension (Alfadil, 2017; Chen et al., 2021; Tai & Chen, 2021).

Thus, using a VR platform in language learning could enhance learners' interest and desire to learn, as it has enormous potential for attracting students. However, focusing on this kind of platform is not efficient, as pedagogical processes need to use various methods in teaching, especially in teaching a novel language. Moreover, educators may not be able to create suitable lessons solely via a VR platform

Table 3. Data collection tools

Data Collection Tools	N	%
Questionnaire	8	40
Observation	2	10
Interview	6	30
Tests	4	20

Table 4. Improved skills

Skill	N	%
Listening comprehension	2	10
Vocabulary comprehension	6	30
Reading and writing	1	5
Oral proficiency	7	35

because a lesson may need more explanation and practice. For instance, teaching FL grammar via VR could be complicated. This kind of skill needs traditional methods to accomplish proficiency. Furthermore, educators will need knowledge in using technology tools in order to create and manage lessons carefully. This could be another burden on the teachers that may affect their teaching ability. Thus, teaching FL using VR tools requires highly qualified teachers who can combine these skills.

In summary, VR platforms play a massive role in FL education and has the ability to capture students' interests; however, VR should be integrated with several other methods of FL teaching to enhance the pedagogical process.

CONCLUSION

The rapid development of VR tools increases the potential of FL learning. This paper provided an analysis of current studies that used VR in FL learning in 2020–2021. The results of this study show that incorporating VR into the language classes is enhancing learners' efficacy in various skills. VR is a valuable and applicable tool in language education. As using VR technology in teaching and learning a foreign language is still emerging and growing, much further research is required to investigate the effectiveness of using VR in foreign language learning in students with a high technology skill level to entirely understand its potential. Moreover, more studies are needed to investigate the integration of VR with other methods implemented in the language classes.

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