

Virtual Reality in the Teaching of FLE in a Brazilian Public School

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Abstract: Considering the emergence of digital information and communication technologies in the contemporary educational context, this work aims to explore the possibilities offered by Virtual Reality (VR) headsets in the school environment, and also to verify how they can contribute to foreign language teaching and learning. The motivation of this work is a result of a pedagogical practice experience carried out by the researcher during French classes in a Brazilian foreign language teaching project in public schools. This pedagogical practice later became the subject of their master’s research, which is currently being conducted in the same educational context in two French language classes. The main objective consists of verifying to what extent VR can contribute to foreign language teaching/learning, focusing on the four linguistic competences and motivation. The methodology of this work has a qualitative nature with some quantitative results, and is characterized as Action Research, as the researcher participated in the activities. These activities consisted of using Google Cardboard, a VR headset, to present interactive 360° videos and tours of real places. The preliminary results show that activities with VR can promote a high level of motivation and engagement, also contributing to the development of the four linguistic competences.

Keywords: Virtual Reality; language learning; Français Langue Étrangère; Google Cardboard

1. Introduction

The way people interact with the world and with themselves is being changed through technology. Gradually, new devices and digital resources enter the field of education, bringing several contributions to the improvement of teaching and learning in different spheres of knowledge. Concerning foreign language teaching and learning, this is not different. New tools emerge every day, which can be used inside and outside the classroom, providing different educational paths for teachers and learners. The current work arises from this context, aiming to investigate a new pedagogical practice using Virtual Reality headsets in foreign language teaching. This study presents preliminary results from a master’s degree research taking place in Brazil in two French language classes in a Brazilian public school.

Analogous/similarly to the emergence of new tools and devices, many methods and approaches in language teaching emerged throughout the 20th and 21st Centuries (Richards and Rodgers 1999; Larsen-Freeman and Anderson 2011). From the structuralist Grammar–Translation Method to the innovative Communicative Approach, teachers, learners and schools have sought the best method to learn languages. However, as Prabhu (1990) declares, there is no best method. Language learning is a complex process, composed by intrinsic (affective, physical and socio-cognitive) and extrinsic variables (learning material, time to study, exposition to the target language), in which different configurations lead to different ways of learning (Almeida Filho 2007).

Kumaravadivelu (2003) also recognizes the existence of different variables concerning language teaching and learning, described in his Postmethod Pedagogy, structured in a three-dimensional

system, composed by the parameters of particularity, practicality and possibility. He argues, specifically in the parameter of particularity, that the concept of method is limited to explaining the complexities of language learning, entailing factors such as the cultural and sociopolitical contexts, the learner's needs, and the cognition of learners and their teachers. In the parameter of practicality, the author sustains the autonomy of teachers, as this parameter understands them as theory generators from their practices, since they possess the tools needed to produce a practical theory. The parameter of possibility seeks social transformation and a continual quest for identity formation through the sociopolitical consciousness brought by the participants to the classroom. Thus, language teachers and learners have the opportunity to impact the context in which they are inserted.

Prabhu (1990) and Kumaravadivelu (2003) conducted research on methods and approaches to language learning. In the Postmethod Pedagogy, considerable efforts are made to go beyond the restraints of methods and approaches, especially in the context where teachers and learners are situated.

We comprehend the autonomy supported by the Postmethod Pedagogy as favorable to using new technologies in language learning, because teaching is not restrained by a particular set of rules or instructions found in some methods, thus the teacher is free to make use of the best tools needed to support the characteristics described in the parameters of particularity, practicality and possibility, as well as the micro and macro strategies proposed by the Postmethod.

Despite all of the attempts to diffuse new technologies in education, there is still resistance within educational contexts (Paiva 2015). This resistance is not solely found in teachers, professors or educational administrators, but also in students. We agree with Lévy (1999) that we need to build new models of knowledge spaces, which are emergent, open, and continuous.

1.1. Computer-Assisted Learning (CALL) and Mobile-Assisted Language Learning (MALL) in a Brazilian Educational Context

Taking into account the Brazilian educational context, where the present research takes place, the use of digital resources is in constant debate. A recent study (TpE and DRI 2017) has shown that 55% of public school teachers make use of digital technology; however, 54% of teachers declared that they could use more of this resource as long as it does not implicate a higher workload. Considering that four in 10 teachers (41%) in Brazilian basic education also work in complementary activities to increase their income (Todos pela Educação and INEP 2015), inside and outside the educational domain, workload is an important element which must be pondered. Besides workload, other factors such as poor infrastructure, a lack of continuing education, low income and issues inside the classroom affect the Brazilian educational landscape, preventing the effective diffusion of digital technologies for educational purposes. Regarding language learning, the normalization phase of Computer-Assisted Language Learning (CALL) (Bax 2003; Paiva 2015) is still far from being a reality when we consider the current scenario. Even though several Brazilian institutions are making efforts to change it, such as universities, governmental and non-profit organizations, as well as private institutions, there is a considerable amount of work yet to be done.

Nonetheless, with the emergence of mobile devices such as smartphones, tablets and small laptops, there has been a shift towards the normalization of CALL, as described by Bax (2003), especially concerning the physical position of computers “in every classroom, on every desk, in every bag” and this type of feedback “interpreting, evaluating, commenting, stimulating thought” (p. 21). Concerns related to infrastructure, for example, are no longer an issue. The need for computer laboratories, costly and sizable spaces to maintain a set of equipment, is overlapped by powerful devices small enough to fit in the palm of our hands. Leffa and Irala (2014) stated that with smartphones, we carry the world in our pocket. This is a significant statement, since teachers and students can nowadays easily access a plethora of information and connect with anyone in the world, making new possibilities feasible in education. In the domain of language learning, mobile devices have facilitated the access to content in the target language once restricted or difficult to find. CALL is continuously growing, and is occupying an important place in classrooms and homes.

In Brazil, there is a recurring debate over the use of smartphones in classrooms. There are teachers, principals and educational supervisors whose opinions and actions are against the use of mobile devices. On the other hand, many others support their use, recognizing the pedagogical benefits provided by these devices. Within the governmental framework, there are laws which forbid the use of mobile devices, especially smartphones; however, some Brazilian states have recently allowed schools to use them for ‘pedagogical practices’, which is the case of São Paulo State, where this research takes place (Balestrini et al. 2018). Despite the current scenario, efforts are being taken to promote the use of these devices in schools. In São Paulo state, for example, courses and projects within the Education Department seek to promote the use of digital technologies and mobile devices in schools (Balestrini et al. 2018). Universities also have a crucial role, since they are responsible for teacher training, as well as research that can contribute to the changing of this scenario.

1.2. Virtual Reality

The world is within our reach, not only using our hands (via devices such as smartphones) but also through our eyes, by using Google Cardboard (<https://vr.google.com/cardboard>), a virtual reality (VR) platform which uses smartphones and affordable headsets to promote VR experiences. The platform was launched in 2014, and since then it has generated substantial interest among media, enthusiasts and the general public. A complete description of the platform and its use will be provided in detail in Section 2. Along with Google Cardboard, other platforms, such as Oculus Rift (<https://www.oculus.com/rift/>), HTC Vive (<https://www.vive.com/us/>) and Steam VR (steamvr.com/) are also responsible for VR popularization in recent years.

However, VR is not as new as some people might think. The history of VR began in 1962 with Sensorama, the first attempt to create an immersive, multi-sensory technology. The machine was created by Morton Heilig and was able to display stereoscopic images, stereo sound and also aromas during movie playback (Tori 2010). In 1968, Ivan Sutherland created the first head-mounted display (henceforth HMD) and conducted the first immersion experiments. Nonetheless, it was during the 1980s that VR made further progress (Tori et al. 2006). Since then, this technology has reached the domains of computer sciences, entertainment and education. It is used, for example, in medical simulations, military training, automobiles and aviation.

Sherman and Craig (2003) affirm that VR is still being defined, due to the fact that this technology is in constant development and researchers, as well as users, have their own point of view. Morie (1994) declares that there are three basic ideas which define the essence of VR: immersion, interactivity and involvement. Another definition is made by Tori et al. (2006), who comprehend VR as an advanced interface for computational applications, characterized by user navigation and interaction, in real time, within a three-dimensional environment. The user can make use of multisensorial devices to act and receive feedback in the environment. Lastly, we agree with Latta and Oberg (1994), who describe VR as an advanced human interface, where real-world scenarios are simulated in a realistic way.

In education, VR has a strong potential to provide news paths and possibilities for learning. Now, students are able to cross the barriers of blackboards, books, digital screens and even physical places. They can go as deep as our DNA and see how new cells are formed, within an interactive environment. They can travel to planets with their colleagues, without the physical limitation of gravity, while the teacher explains the characteristics of our solar system. Now, it is possible to leave the freezing Artic and enjoy the beautiful Amazon River in just a matter of seconds, in 360 degrees. The possibilities are vast. As Braga (2001) states, VR represents a new dynamic and creative paradigm in education, where learners are placed at the center of the learning process. They are able to interact, modify and create, promoting active learning.

Particularly in language learning, VR can promote a high level of motivation, which will be discussed in the Results and Discussion sections, since students are able to travel virtually to places where their target language is spoken. Applications with VR support are growing every day. Some of them are specifically appropriate for people to learn languages, such as Mondly VR (www.mondly.com),

but others can also be used to promote language learning. Interaction with other people in the target language, for example, can shift from digital screens to virtual social networks through apps like vTime (vtime.net) and Facebook Spaces (www.facebook.com/spaces). In this study, specifically, we have worked with 360° videos using a VR media player and Google Tour Creator (vr.google.com/tourcreator/), a platform where users can visit tours created by other users and also create their own tours using imagery from Google Street View or their own 360° photos.

Concerning studies in this field, Lin and Lan (2015) developed a survey focusing on the use of VR for language learning. The authors reviewed publications (between 2004 and 2013) in scientific journals on computer-mediated language learning. In the survey, they analyzed 29 published articles in terms of: number of VR-related publications, topics on language learning investigated, target audience, and the types of technology used in VR studies (considering the three types categorized by (Sykes et al. 2008): open social virtualities, massively multiplayer online games and synthetic immersive environments). The authors verified that only 3.6% of the articles published in the four journals were related to the VR field, but the number of works with this focus is increasing, since it is a feature that allows multimodal communication and reduce learning barriers, such as anxiety and inhibition. The most common topic is related to learners' differences in interactive communication, followed by learning tasks. The least common theme is collaborative learning. It can be observed, however, that there are only a few papers that focus on the teacher, such as his/her role in a classroom setting with VR or ways of integrating VR into pedagogical activities. The most popular tool investigated is Open Social Virtualities (OSV).

In terms of ways of integrating VR into the classroom, this study has the main objective of investigating how activities with VR can contribute to language learning, specifically French, focusing on motivation and the development of the four linguistic skills—oral comprehension/production and written comprehension/production.

2. Materials and Methods

As mentioned earlier, the central objective of this research is to understand how VR can contribute to the learning processes of individuals in a language learning class. Therefore, to achieve this objective, we adopted the methodology of Action Research, characterized as a social investigation of a particular problem, with an empirical basis, in which the researchers and participants are involved in a cooperative or participatory mode (Thiollent 1998; Fonseca 2002; Tripp 2005). This study is predominantly characterized as qualitative, since the majority of results cannot be quantified, and we seek to understand the relationship between the individuals and the VR device (Bogdan and Biklen 1999). Therefore, we also include some quantitative data and results.

The researcher also aims to gain a better understanding of the outcomes and issues of this practice, cooperatively with the participants, i.e., the teacher and the students. Furthermore, this intervention also aims to change the environment in which the research takes place, since it seeks to contribute to the linguistic development of the learners, considering the four linguistic abilities and the increase in motivation. The implementation of a new practice, i.e., the use of VR in language learning, which has been used in other areas, e.g., medical training and physics teaching, in order to investigate and develop contributions to a particular environment characterizes this research as a Practical Action Research (Tripp 2005; Grundy and Kemmis 1982).

We adopted the basic cycle of action research (Tripp 2005; Grundy and Kemmis 1982), consisting of four stages: 1. planning activities and the practice; 2. acting, which consists of implementing these activities and this practice; 3. observation and description of the results; 4. reflecting on the results and the beginning of another cycle with improvements. To support stages 3 and 4, the instruments used for observation and reflection comprise video recordings, researcher diaries, questionnaires and interviews, which are described in detail in Section 2.6.

2.1. The Virtual Reality Device

To carry out language learning activities with VR, we have chosen Google Cardboard as the VR platform due to the fact that it is easy to obtain and inexpensive. This platform can be used through three elements: 1. Cardboard Viewer; 2. Smartphone; 3. Android Application. The Cardboard Viewer, also called HMD, is the hardware used to display the VR content and features: the holder/enclosure for smartphones, a pair of special lenses and a button used to perform actions, with an application which supports the Cardboard. The smartphone needs to support Android or iOS, and must have a built-in gyroscope in order to work properly. The gyroscope is a sensor used to measure orientation and angular velocity, which enables head movement tracking. Lastly, the Android application is the software that will run the content that will be displayed in the headset.

The Cardboard original project (Figure 1a) can be easily assembled, since it is basically cardboard paper and a pair of biconvex lens. The blueprint is available to download on the Cardboard website, along with the assembly instructions. However, many companies produce headsets based on the project. For this research, we have chosen to buy a few VR BOSS Z5 headsets (Figure 1b), featuring built-in headphones, microphones and superior lenses.



Figure 1. Example of Virtual Reality headsets. (a) Google Cardboard. (b) VR BOSS Z5.

2.2. Participants and Structure of the Activities

The participants are students from two classes where French language is taught, in a project called *Centro de Estudo Línguas* (henceforth CEL), which takes place in Brazilian public schools in the State of São Paulo. Along with the students, their teacher also took part in the research. The French course in CEL is divided into six stages of one semester each, which totalizes three years. The first class was at the first stage, which we call F1, where 10 students participated in the research. In the other group, there were two levels in the same class, F3 and F6, consisting of 13 students. This is a recurrent problem in CEL, since it merges two different classes, even from different levels, when one of them has a low number of students. The age of the students varied from 11 to 18 years old.

Since this research is still in progress, we will present the preliminary results from the second semester of 2018, when the first activities took place. In F1, a total of 3 activities were carried out, and in F3/F6, 2 activities. It is important to highlight that, since this is an interventional study including humans, all participants gave their consent for data use before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the Universidade Estadual Paulista “Júlio de Mesquita Filho” (CAAE: 87273518.0.0000.5400).

The activities were planned with the class teacher in order to suit the semester syllabus. Thus, they would be in accordance with the French course curriculum of CEL. At first, five activities were planned for F1 and four for F3/F6. However, as we will discuss further ahead, we could not complete all of them. The structure was divided into three parts: the first, called pre-activity, consisted of the work before using VR; the second was the central activity, in which VR was used; the third, called post-activity, included the activities after using VR. It is important to highlight that all parts are equal

in importance. We called the second one “central” since all the activities revolve around VR, but all of them were essential.

2.3. Activity Plan

The activities were planned considering the three basic ideas of VR: immersion, interactivity and involvement (Morie 1994). However, they were conducted bearing in mind an interactivity gradation from the first to the last activity. The first experience was carried out using 360° videos, in which interaction was limited to head tracking movements, called rotational navigation. It can be defined as navigational interactivity (Naimark 2016), given that the user can see and hear within the environment but cannot affect it in any way. The last experience increased the degree of interaction, as it consisted of using the Google Tour Creator to visit places available in Google Street View designed as tours. This means that these tours display 360° images with additional information as pop-ups, comprising texts, images and audios. The user can interact with these pop-ups by pressing the action button on HMD.

The pre- and post-activities were planned to apply the macro and micro strategies proposed by the Postmethod (Kumaravadivelu 2003 as the pedagogical background, as well as Active Learning Methodologies (Morán 2015; Valente 2014)). Therefore, students were put in the center of the learning process, performing activities such as: using their own mobile phones to experience VR through Cardboard; researching and presenting information to the teacher and other students; group discussions and group work; and creating their own tours in VR; among others which will be discussed further ahead.

2.4. Activities with 360° Videos

Videos in 360° were chosen bearing in mind that they are one of the simplest ways to experience VR through Cardboard, since players in VR are lightweight and do not require mobile devices with high processing power to run videos. This type of media is also easily available through streaming services such as Youtube ([youtube.com](https://www.youtube.com)) and Vimeo ([vimeo.com](https://www.vimeo.com)). In addition, videos are a useful pedagogical tool for language learning in the classroom (Watkins and Wilkins 2011), facilitating access to cultural and linguistic content in the target language. Furthermore, with the ascension and popularization of VR, the limited playback through screens is surpassed by a stereoscopic immersion, allowing students to be involved, even if virtually, in an enhanced experience.

The chosen VR player for the activities was the VR Player Free (<http://www.vrplayer.com>) (Figure 2), due to its small size (2.8 mb) and simplicity. The video content was aligned with the topics of the French course, comprising countries and nationalities, dreams and desires, vacations and traditional events, among others that are described in the Section 7. Students used HMDs to experience VR videos between the pre- and post- parts of activities.

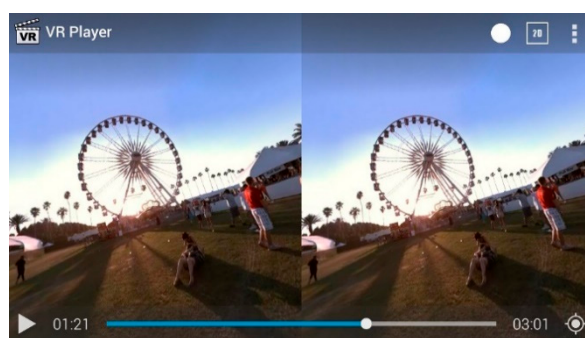


Figure 2. VR Player Free (VIMERSIV, Inc., Terrebonne, QC, Canada, www.vrplayer.com) playback screen.

2.5. Activities with Virtual Tours

For these activities, the Google Tour Creator was chosen due to its user-friendly interface, high compatibility through operating systems and large amount of available content, since it is connected to Google Street View, allowing the use of 360° images of many places around the globe. Regarding high compatibility, this is a result of its technology which enables tours to be played on Internet browsers, therefore allowing users from different operating systems, on mobile and desktops, to access the content.

Virtual tours created by the researcher were introduced in activity number 2 of F1. Previously, past activities only supported rotational navigation. However, the Google Tour Creator supports an increased interaction and feedback, since users can activate an action button to interact with the environment through pop-ups, called points of interest, containing text, images and audio, presented in Figure 3. In activity 2 (F1), students experienced a virtual tour with two scenes in Paris: the Eiffel Tower and the Louvre Museum outdoors.



Figure 3. Google Tour Creator (Google LLC, Mountain View, CA, USA, vr.google.com/tourcreator) visualization screen of a student created tour: (a) Desktop internet browser screen; (b) Smartphone internet browser screen in VR mode.

In the next activity, number 3 (F1), the students created their own virtual tours based on their dreams and desires. They used the school computer laboratory to create their tours, while using online tools, such as dictionaries and wikis, to search for information to complete the task. Then, in the next part of the activity, they published their own virtual tours in VR using the HMDs online, and presented them to the teacher and other colleagues.

2.6. Data Collection

The activities with VR began in early September 2018 and continued through early December 2018. A total of 5 activities were completed, 3 in F1 and 2 in F2. However, all the activities lasted more than one class to be completed, totalizing 12 meetings, due to issues related to course planning and availability to carry out the activities in classes, since we avoided interference in the semester progress. It is also important to highlight that at the beginning of the research we only had 1 HMD, an issue that was later solved by purchasing 4 HMDs.

For data collection, we recorded the activities on video, and asked students and teachers to fill in questionnaires for each activity and also a final questionnaire. We also interviewed students and the teacher (nonetheless, we were not able to distribute the final questionnaire to F1, totalizing 6 students). Therefore, the teacher answered 5 questionnaires, the researcher conducted 13 interviews with students, and he also kept diaries where he noted down observations and descriptions of each activity.

Given that we followed the basic cycle of action research during each activity, improvements to questionnaires were made during the reflection stage of the cycle. As we will present general results, we considered only the final questionnaires of each class and the most relevant questions and answers

(see Section 7 for the full questionnaires). For multiple choice questions, we used the Likert scale to gather information from students. We also included free text questions. Questions asked during interviews are described in Section 7—Common questionnaire questions.

3. Results

This section presents a summary of the data from the questionnaires, diaries, interviews and video recordings. It is important to highlight that this study is still in progress and the completion of activities is planned for June 2019, thus we will present preliminary results from the first stage that took place in the second semester of 2018. It is also important to make clear that, for this paper, we decided to present a general view of the results, consequently not discussing in detail each activity and each collected datum.

3.1. Teacher

The teacher totally agreed that the activities carried out during the semester contributed to the lessons and the learning process of the students, highlighting that they aroused greater interest in the French classes, drawing students' attention and allowing them to immerse themselves in an unknown environment. She also emphasized that students were able to act as agents in their own learning, especially in the tour creation activities, not being merely spectators.

Regarding the development of the four linguistic competences, she pointed out that all of them were equally covered and well developed. The tasks with video playbacks, for example, greatly contributed to their oral comprehension, as students could listen to people in a virtual environment, increasing their attention to oral segments of speech. Group discussions after the video playbacks also contributed to their oral production, as well as the tour creation activity, since students had to record audio tracks to present some information in their virtual tours as a narration.

The teacher also noted that written competence was greatly improved through the production of texts related to the VR activities. She declared that they felt more motivated to produce these texts, and most subjects studied in lessons were in use during these activities, e.g., vocabulary, verb conjugations and verb tenses. Written comprehension was considered through the activities where students had to search for more information about some places seen in a virtual environment, e.g., Martinique and Nigeria.

Concerning motivation, she affirmed that it was especially taken into account while using VR, since the process of learning could go beyond the traditional resources commonly used in classes. She also stressed that these resources, i.e., text, audio, images and video, could even be used simultaneously during the activities. She pointed out the fact that by using VR, students could get closer to the culture of their target language, which is sometimes far away from their realities. This was an important motivation factor, since students were taken away from their physical space and could experience a different reality, even if only virtually.

She also stated that students showed better progress during the lessons, when compared to another class at the same level. She argued that in classes at F1 level, students normally do not practice oral production. However, when it was induced in activities with VR, students were more engaged and completed the activities without the usual resistance found in students at this level. In F3/F6, the teacher suggested an improvement in written production and comprehension, since they were engaged in writing activities after watching VR videos.

3.2. Students from F3/F6

A total of seven students answered this questionnaire. For the question "Did you like the activities carried out with VR during the semester", 71% of the students answered, "Totally agree", while 29% chose "Agree". The exact same percentage applies to the question "Do you believe that the activities contributed to the retention of the content worked in lessons?" and "Would you like to do more

activities with VR?”. Regarding the question “Did you feel motivated during the activities carried out through the semester”, 57.1% of the students answered “Totally agree”, while 42.9% chose “Agree”.

Regarding the questions related to the four linguistic competences, we asked the students to evaluate, on a scale from 1 to 5, how much the activities with VR were effective in the development of a particular competence, considering their experience during the semester. The following charts represent (Figures 4 and 5) the score attributed to each competence.

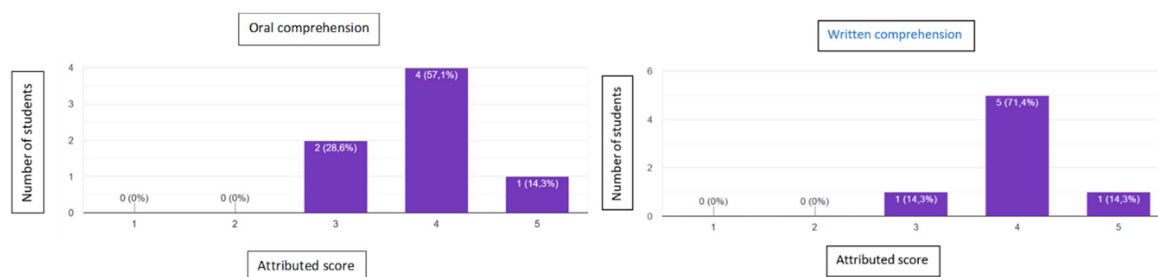


Figure 4. Comprehension competences chart of F3/F6 students.

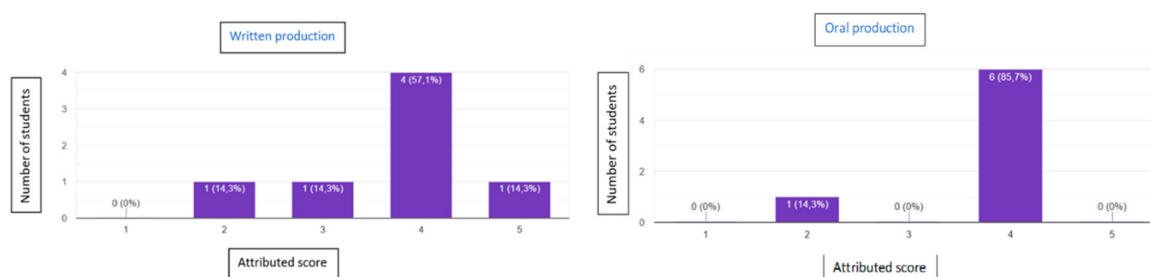


Figure 5. Production competences chart of F3/F6 students.

In open-ended questions, all students affirmed that they believe that the activities with VR can help with learning foreign languages, and all of them want to carry on with the activities. Only one student experienced discomfort during the activities with VR.

3.3. Students from F1

A total of five students answered the questionnaire. For the questions “Did you like the activities carried out with VR during the semester” and “Do you believe that the activities contributed to the retention of the content worked in lessons?”, 100% of the students totally agreed. For the question “Did you feel motivated during the activities?”, 60% answered “Totally agree”, while 40% chose “Agree”.

Students from F1 also answered a question about their sense of immersion during the last activity, in which 75% of students attributed a score of 4 and 25% a score of 5. As for the four linguistic competences, when asked to give a score from 1 to 5, most students attributed 4 and 5 to the effectiveness of linguistic production and comprehension competences during the activities with VR.

In the answers of open-ended questions, students considered that VR can help with the learning of foreign languages, and some students asked for more activities with VR, highlighting a great contribution to their comprehension of the French language and their understanding of other cultures. None experienced discomfort during the activities and when using HMDs.

4. Discussion

The preliminary results of this study show that the utilization of VR, especially through the Cardboard platform, can be a powerful tool in language learning. Firstly, due to the fact that Cardboard requires only a supported smartphone and a cheap headset, the promotion of MALL and digital technology in classrooms and schools can be expanded. The issues regarding spending a considerable

amount of money to buy computers, build laboratories and purchase other expensive equipment can be solved by using smartphones, representing, as we discussed in the Introduction, a step towards the normalization phase of computers in language learning (Bax 2003; Chambers and Bax 2006; Paiva 2015).

In addition, as a result of this promotion, the problem concerning smartphones in Brazil (Balestrini et al. 2018) can also move a step further toward a better understanding and acceptability in Brazilian schools. By using VR with the Cardboard platform, and consequently using smartphones, we have fertile ground to promote the idea that with smartphones, we can carry the world in our pockets (Leffa and Irala 2014). For this reason, teachers and educational administrators are able to perceive it as a useful tool, in contrast to the idea of having a negative effect, which is found in many Brazilian schools.

The development of active learning was also observed during the activities with VR. As the teacher stated, the learners could act as agents in their own learning through activities such as virtual tour creation, group work and discussions. Learners were encouraged to leave their comfort zone, i.e., their desks and their traditional learning methodologies, and were able to experience new places and cultures through VR and the related activities. Therefore, learners were in the center of learning processes, not being merely spectators, but acting dynamically in the classroom.

The harmony of the activities with the Postmethod principles (Kumaravadivelu 2003), in terms of the autonomy of teacher and learners, raising social consciousness, integrating linguistic skills, maximizing learning opportunities, and contextualizing linguistic inputs were all observed while carrying out the activities. This supports the idea that digital information and communications technology (DICT) contributes to effective language learning (Valente 2014) in the contemporary context.

Regarding the four linguistic skills, the teacher and the students recognized that the activities were notably positive in their development. As the teacher stated, all the four skills were equally well considered during the activities. Students were encouraged to work even with the those who were less developed in the context of CEL, i.e., oral production and oral comprehension.

Motivation, however, was the salient point in all the activities. The teacher and the researcher observed that all the students were highly motivated before, during and after using VR. At first, as they declared in the interviews and questionnaires, it was the innovative aspect of this technology that attracted them. Throughout the activities, they demonstrated great interest and enjoyment when watching the videos and interacting with the tours, which were presented in the textbook or mentioned during lessons.

Subsequently, better engagement was observed, resulting in more interest regarding lessons, the French language and francophone culture. We understand these consequences as a fostering of intrinsic motivation (Brown 1990; Dörnyei 1994), where the possibilities brought by VR awaken natural curiosity concerning the target language and culture, promoting enjoyable learning.

Despite the results, we recognize that further investigations related to the development of linguistic skills within the virtual environment still need to be made. This study considered the broader context of the pre-activities and post-activities, thus not investigating the virtual environment itself at a deeper level. Language learning activities in virtual spaces where the students get together is possible; however, it is still restricted to factors such as smartphones with higher processing power and a good internet connection.

5. Limitations of the Study

Since this study is still in progress, there are some limitations. Firstly, more activities need to be conducted considering the final feedback given by the teacher and the students, as well as the researcher's observations. A new set of activities can contribute to a new Action Research cycle, allowing more consistent results and discussion.

The fact that this study is being conducted in a specific school setting, with a low number of students, can also be taken as a limitation. However, it demonstrates a good starting point for future research on this subject, allowing for important considerations when using VR in language learning.

Other classes and groups of students who did not use the technology were initially considered as a means of comparison. Nonetheless, due to the low number of students, the complexity of the language learning process, which comprehends various variables (Almeida Filho 2007) and, lastly, the impossibility to follow other classes during this first cycle of the research, we chose not to make comparisons.

During the activities, the researcher also had limitations concerning the number of devices. As we said, initially, only one HMD and one smartphone were used. Later, more devices were acquired, allowing a better development of the activities. Nevertheless, the researcher is still depending on the students' smartphones in order to complete the activities. Even with a higher number of HMDs (a total of five), sometimes only some of them were used because students did not have compatible smartphones available. This limitation shows that the use of VR can still be difficult in some contexts, especially those whose financial support is restricted.

6. Conclusions

The recent popularization of VR represents a noticeable phenomenon, especially with the creation of the low-cost VR platform Google Cardboard. In education, VR can be considered as a powerful tool to enhance learning in different fields of knowledge. Previously used only in restricted fields, e.g., medical simulation and aviation training, now we observe an expansion of possibilities, as new VR devices and applications are being created and developed in great numbers, allowing more access at lower costs, if we compare them to previous VR devices. Considering tools such as Google Tour Creator and the A-frame (<https://aframe.io>), a web framework for developing VR applications, people can easily create VR experiences and share them with others.

There are many possibilities regarding language learning. This study mainly focused on using VR as an integration into pedagogical activities; however, as Lin and Lan (2015) presented, there are other ways to explore the potential of this technology. New VR tools and applications are being developed with a focus on language learning, for example, Mondly VR (www.mondly.com). Probably, in the near future, educators will have a good set of tools to choose from, and whether focused on language learning or not they will still be of great use in this field. Nevertheless, especially in the Brazilian educational context, we still need to promote the use of educational technology in schools, particularly using smartphones, which is proving to be a great tool in educational contexts.

This study has shown some results concerning the motivation and development of four linguistic abilities in language learning using VR. However, we still need to plan and carry out more activities with more students in different educational contexts, also considering a longer period of time. Then, we will have consistent results and a better understanding of how this technology can contribute to language learning. Next semester we intend to use the feedback given by the students, the teacher and the researcher's observations to design more activities using VR. We also intend to review the methodological procedures to improve data collection and the development of the activities.

Finally, with the advancement of this study, we hope to encourage educators and researchers to use VR in language teaching and learning, demonstrating the capabilities of this device in this field, as well as the needs and demands for academic research on this subject. We also aim to promote the use of educational technology in Brazilian schools, by disseminating the results of this study.

7. Common Questionnaire Questions

These questions were present in all questionnaires. Some questionnaires had dedicated questions to cover specific activities. We decided to present only common questionnaire questions since we do not have full results of the activities presented on this paper.

1. Did you like the activity?
2. Do you think that you have used efficiently the content you have learned during the classes in the activity with VR?

3. Do you think that the activity has collaborated with the retention of lesson content?
4. The activity with VR has fit the lesson theme?
5. Did you feel motivated during the activity?
6. Did you feel immersed during the activity?
7. From 1 to 5, how much would you like to know the places shown in the activities?
8. From 1 to 5, how much the activity was effective in your oral comprehension?
9. From 1 to 5, how much the activity was effective in your oral production?
10. From 1 to 5, how much the activity was effective in your written comprehension?
11. From 1 to 5, how much the activity was effective in your written production?
12. Did you experience any discomfort during the use of VR headsets?
13. Would you like to have more activities with VR?
14. What did you like that most in the activity? Consider all the moments.
15. From this experience, do you think that VR can contribute to the learning of foreign languages?

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