Introducing *Dreams of Dali* in a Tertiary Education ESP Course: Technological and Pedagogical Implementations

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Abstract. Technology-enhanced teaching and learning environments transform the learning experience and increase student interest and engagement in the lesson. Virtual Reality (VR) has been identified as a multimodal medium that offers highly interactive and fully immersive experiences through which students can access a variety of meanings and enter a new social learning space which transcends classroom boundaries. VR also constitutes an innovative digital tool for foreign language (FL) learning in tertiary education through which teachers can promote a more situated learning context. Based on the multimodal affordances of the VR application *Dreams of Dali*, this paper aims to propose meaningful ways the application can be embedded in an English-for-Specific-Purposes (ESP) course in tertiary education, foregrounding the delivery of pedagogical content, creating student immersive literacy practices, and leading to alternative ways of conceptualising meanings. The immersive environment in *Dreams of Dali* can pose an instructional design tool which can increase familiarisation with course-related content in English for Fine Arts and help simulate an authentic surrealistic environment that deviates from static art-related images and passive surrealist representations of the art movement in the classroom.

Keywords: Virtual Reality-Enhanced Language Learning · Dreams of Dali · ESP

1 Introduction

New and more sophisticated technologies have entered the world of education, providing students with limitless opportunities for engaging learning experiences [1], and drastically changing the way meanings are communicated and represented through the "new media" [2]. Virtual Reality, or also known as immersive VR, refers to the technological system with a computer capable of real-time animation, initiated by wired gloves, a position tracker and a head-mounted display device (HMD) for capturing a visual output [3]. As an innovative instructional tool, VR has been implemented in engineering and multidisciplinary courses, in the automotive and aerospace industries [4], in entertainment and in language learning education [5], rendering it one of the most popular mainstream consumer educational tools. So far, there have been several affordable and easy-to-use

VR hardware and software systems, like the Samsung Gear VR, a wearable device, supported by a Samsung Galaxy smart phone [6], Google Expeditions [7], Oculus Go [8], a standalone, portable and wireless VR headset, PlayStation VR, Microsoft HoloLens [9], AltspaceVR with Oculus Quest 2 [10], and many more.

Despite some technical pitfalls in embedding VR in the lesson like regular updates, training requirements and non-technical issues like a need for familiarisation with the equipment [11], VR is predicted to be exponentially adopted for educational purposes, since it can represent a real or imaginative environment and enhance the situated experience for learners [12, 13]. VR promotes an experimental and experiential view of learning with learners actively reconstructing their knowledge based on their own existing internal model of the world [14]. Concerned with bridging the gap between the technology and pedagogy of 3D virtual learning environments (VLEs), Fowler [15] draws attention to the need of assigning a more pedagogical scope and focusing on the learning outcomes through the interaction of the technical property of VR, i.e. "immersion" and the psychological state of "presence". Based on the aforementioned affordances, the present paper proposes the implementation of the VR application *Dreams of Dali* in the ESP course English for Fine Arts. More specifically, the aim is to increase student familiarisation with course-related content through authentic interactions with the cultural element of Surrealism, and to construct meaningful personalised understandings for students through immersion and presence in a highly immersive VR system. Through *Dreams of Dali* in the highly immersive environment, Salvador Dali's artistic techniques and Surrealism as a taught art movement, can enable learners to, simultaneously, conceptualise parallel meanings and physically experience the content, not just learn about it. Through this experience, one may witness a shift in the role of learners who are neither readers of surrealistic static images and texts nor viewers of informative videos anymore; they become user participants of the authentic surrealistic environment where simulation is more than a multimodal experience: it is a subjective experience in terms of "presence" (the feeling of "being" in the authentic virtual Dali cultural context) [16] and an objective experience (the feeling of being immersed in the virtual space).

Lee and Wong [17] stated that the application of VR in arts and humanities was disregarded. They also pointed out the opportunities for entering highly immersive contexts since students can visit historical or fictional events and participate in abstract spaces or processes to enhance their learning experience. Dreams of Dali is a suitable virtual environment that can initiate the opportunity for Fine Arts students to enter a mythical space that simulates a painting by Salvador Dali and enhance the cultural knowledge of Fine Arts students. Moreover, this paper addresses the gap in the literature on fully immersive VR pedagogical applications and the relationship between immersion and presence since there is dire need to align those affordances with pedagogy [18].

Simulations in highly immersive VR foreground two profound affordances, that of a) immersion and b) presence. Scavarelli, Arya, and Teather [19] refer to immersion as an objective experience, delivered by the VR technology which covers various sensory modalities that reflect human real-world senses, and presence as the subjective experience of the user in accepting the artificial reality as reality. They also define embodiment as the mental representations of the body within the virtual space. The students' navigation in the surrealistic context becomes more effective as an embodied experience since,

according to Johnson-Glenberg [20], embodiment, i.e. body movements with gestures, can facilitate cognitive activity and help students reflect on the embodied representations of their ideas. The multisensory experience of fully immersive VR exploits all five senses: vision, audition, touch, taste, and olfaction [21].

2   Description

2.1   General Description of *Dreams of Dali*

Dreams of Dali is an artistic application which offers a three-dimensional experience of Salvador Dali's surrealistic painting *Archaeological Reminiscence of Millet's 'Angelus'*. It has been running as a digital experience in the Exhibits section of the Dali Museum in St. Petersburg, Florida since 2016. The production company Goodby Silverstein and Partners developed this Surrealist application, which offers a single-user experience into the world of the visionary artist, Salvador Dali. Praised internationally by museum visitors and users, it has also gained many industry awards. Two additional advantages of the application are that first, it is free, and second, users can immerse in surrealist environment from a seated or a standing position.

Fig. 1. The original painting, *The Angelus*, by Jean-Francois Millet. (Image credit: Wikipedia)

Dali painted *Archaeological Reminiscence of Millet's 'Angelus'* from 1933 to 1935. The painting was a revolutionary adaptation and a more provocative version of Jean-Francois Millet's painting *The Angelus* (see Fig. 1). The original painting shows a pair of peasants, bowing over a basket of potatoes in an open field, in what appears to be a praying ritual. Dali, on the other hand, in the vanguard of constant innovation and transformation, gave the painting a more spiritual interpretation based on his subconscious influences. This led to the creation of his surrealist masterpiece, with two figures resembling praying mantises instead of real people like in Millet's version. In Dali's representation, the male

mantis bows in defeat in front of the female one, symbolizing the artist's suppressed fear of female sexuality. The two towering mantises are placed centrally in an empty landscape with a shade of light protruding from the dark sky, creating a mystical, eerie atmosphere.

2.2   Navigation Within the 3D Environment

The artistic liberty of interpretation Dali was aiming for with his surrealist work is reflected as an immersive experience of constant exploration in this application. For starters, the various spheres, or orbs, which are positioned in key spots in the 3D painting, allow for user movement in Dali's 3D context.

Fig. 2. Students point at the sphere to "enter" the painting.

Figure 2 shows the initial sphere students need to point at so that they can immerse themselves in the painting and navigate within the surrealist environment. Students are directed to place the pointer on the sphere for three seconds to move to another element of their choice.

Figure 3 depicts the two mystical praying mantises that one can face the minute they are transported in the virtual context. Students can witness the mantises from all angles since they are placed centrally within the vast landscape. Navigation is not sequential, so they are free to move within the landscape in any order they like by pointing at the sphere. Wandering freely and exploring what is next to come add to a feeling of perpetual mystery since characters vanish and reappear from one minute to the next. In fact, the whole experience feels like venturing out into the unknown, which is a staple to surrealistic art interpretation.

Fig. 3. Facing the praying mantises while being immersed in the surrealist environment.

Fig. 4. Pointing at the sphere can transfer students to the opposite mantis.

Figure 4 illustrates one of the two gigantic mantises with a sphere in its mouth, which students can point at. It is important to stress out that this sudden transferring might cause slight dizziness, especially when trying look down to the ground. Students also have a chance to marvel at more surreal elements from Dali's work in their immersive voyage since the application incorporates some classic elements from other paintings, e.g., the marching elephants on beanstalk legs from his painting *The Elephants* and the bewildering synthesis of a lobster and a telephone from his work *Lobster Telephone*.

2.3 Technological Features of *Dreams of Dali*

According to the Dali Museum website [22], interested users may resort to the experience of a linear 360° video through Google Cardboard, Samsung Gear VR, or Daydream (lower-cost devices), all of which are now discontinued and no longer commercially available if one wishes to purchase them. A conventional 2D showing of the video can be viewed by a smartphone, tablet, or PC, or by a simple click on YouTube. A fully immersive experience of the application, as featured in tethered headsets like HTC VIVE, Oculus Rift, and Valve Index [23], can now be experienced with standalone headsets like Oculus Quest 2, using a link cable or a similar high-quality USB cable. *Dreams of Dali* became available for downloading from platforms such as Steam and VivePort in 2018, offering a fully immersive VR environment, and using special hardware to interact with the world of Dali: a) an HMD which is a wearable display that projects the images and, generally, everything the student is able to see and experience, b) sensors for 360° tracking, c) controllers (or hand-tracking) for interactions and haptic feedback [19] for an embodied experience.

3 Analysis

3.1 Pedagogical Implementations of *Dreams of Dali* in the Language Course

In the era of electronic technologies, there has been prolific use of multimedia resources in language courses, which can lead to the representation of content material through various ways. *Dreams of Dali* offers a situated surrealistic experience for students who study art. However, the authors propose pedagogical ways of implementing the application in a language course in tertiary education, mainly based on the students' reflective practice, even though the application does not fall under the category of language. The reflective practices were implemented in an intervening pilot program in the course *English for Fine Arts*. The authors consider it necessary to find pedagogical utilisations for immersive technologies so that they do not end up being a form of entertainment for students.

In the present ESP course, author 1 employs YouTube videos, multimodal texts, audio tracks, website articles, 360° videos, excerpts from books, online quizzes, and digital artefact sharing platforms. All these resources enable for a more flexible representation of course content delivery for teachers, enriching the lesson and providing language learners with more resources to accommodate their learning needs. Teachers can test the instructional effectiveness of immersive VR and *Dreams of Dali* as an additional multimedia resource through the pedagogical process called *transmediation. Transmediation* involves the translation of one semiotic mode to another [24]. To put it simply, it is a process that shows how learners perceive meaning from different media. In an ESP course, studying the thematic area of the most influential art movements in the world is an integral aspect of the curriculum. Learners are exposed to the characteristics of each movement from information used from various multimedia resources mentioned above. Learners also use the target language to communicate what they understand since the lesson favours a more communicative orientation.

Table 1 shows the progress of transcending multimodal teaching concerning the thematic area of Surrealism and reaching culmination with *Dreams of Dali*. The purpose is not to focus on strict grammar-based tasks and activities, but to choose the most appropriate resources that promote a more contextualised aspect of the subject.

Table 1. The process of transmediation for the study of Surrealism

Surrealism	Resource
Lesson 1: Conventional painting	Lists and image
Lesson 2: 2D video	YouTube
Lesson 3: VR experience	Dreams of Dali

In lesson 1, author 1 taught Surrealism in English as the target language through some indicative artistic examples, one of which was *Archaeological Reminiscence of Millet's 'Angelus'* and introduced the surreal characteristics and concept-related vocabulary using a conventional image of the painting as a learning resource. This process involved the elements of art, for example, lines, shapes, space, and color, along with the principles of art, which included movement, unity, balance, and proportion. In lesson 2, author 1 proceeded with a multimedia resource, a YouTube video, displaying more elaborate forms of input from artists specialising in surrealist art or informative videos about this art movement. In lesson 3, interaction was replaced with immersion in the virtual environment of *Dreams of Dali*. This resource was considered as an effective semiotic domain for the conceptual representation of surrealism for students. It was also ideal for the students because they experienced the elements and principles of art they had learnt. Not only did the application offer a more dynamic multimodal representation of concepts, but learners also had more control over what they were studying. In fact, presenting content in multiple representations maximised learners' understanding that is why the authors were interested in seeing how meaning was negotiated between these various resources. The authors also found it useful to see which one helped them comprehend the content better, manipulate it, and combine it with the target language [25]. After each lesson finished, students reflected on their experience with the resource they interacted. However, it was important to keep in mind that the affordances of each resource were different, so meanings were materialised differently. Language teachers who are interested in enhancing the thematic area of Surrealism with this application should consider that it does not pay any attention to linguistic accuracy, but it serves as an input to extract cultural information and familiarisation with the subject matter.

The authors replaced *traditional grammar* as a concept of meaning making with the process of learning as *Design*. The concept of Design stems from a social semiotic approach to education, referring to the constant transformation one undergoes when making use of their available resources for engaging with meanings culturally towards the implementation of new designs and of the reshaping of new meanings [26]. Therefore, learning becomes a dynamic, transformative process of designing meaning within a range of semiotic modes, apart from speech and writing. In *Dreams of Dali*, learners underwent a transformative experience because they explored how parallel modes of

representation worked together, for example, image, color, music, gesture, space, etc. to have a meaningful outcome. They deviated from the linguistic mode as the most prevalent mode in learning since language alone could not give access to the meanings of multimodal messages. The multimodal affordances of *Dreams of Dali*, e.g., presence, immersion, as well as the use of sensory inputs (realistic graphics, eerie sounds, surreal sights, mystical creatures, etc.), first-person experience, navigation in the learning context, and student autonomy of the learning process [27] enabled learners to conceptualise parallel meanings and physically participate in the content, not just learn about it.

Table 2. Modes of meaning in the immersive environment

Meanings	Realisation of meanings in *Dreams of Dali*
audio	narrative voice of Dali echoing from a distance, eerie sounds, mystical music
written	directions of pointer use at the beginning
visual	the man and the boy holding hands, the praying man, the towering praying mantises
spatial	immersion, a sense of presence
gestural	user movement, marching elephants

Table 2 shows the multimodal modes of meaning [28] that came together in *Dreams of Dali*. As it was already mentioned, learners drew on distinctly different sets of resources for meaning making, motivated by their own interest, therefore, they actively designed meaning which is why learning became a very dynamic experience. They were no longer passive recipients of information about Surrealism. On the contrary, they were exposed to a cultural enactment of Surrealism, and they had full control over the content.

4   Reflective Insights Gained from *Dreams of Dali*

Plastina [29] talked about the need to view the ESP classroom as a multimodal environment where students can negotiate many meaning-making practices apart from language. Due to the fact that the use of VR, AR and MR technologies is decontextualised when it comes to the teaching of a foreign language [30], the instructors considered reflections to be an indispensable part of the lesson, leading to the engagement of reflective practice from students.

After the termination of each lesson, author 1 collected the students' reflections regarding the lesson experience. Based on the students' reflections, the authors organised the subsequent lesson, which revolved around helping the students with their VR experience. At the end of the third lesson, students were given an anonymous questionnaire through which they expressed their experiences and opinions. The authors resorted to the use of an anonymous questionnaire to enable the students to express themselves freely. The questionnaire was paper-based and consisted of four close-ended and three open-ended questions. Questions 1–3 focused on the students' experience regarding VR whereas question 4 aimed to gauge the extent to which students internalised the steps

of the VR learning experience. In question 5, the students reflected and evaluated their experience in the application *Dreams of Dali*, whereas in question 6, they were asked to express their suggestions for the ways VR can be implemented in the Fine Arts field of study. It should be noted that these suggestions emerged from the students' immersive experience in *Dreams of Dali*. The final question asked students to describe and reflect on their overall experience.

4.1   Reflective Examples

Some indicative examples from the students' reflective questionnaires are presented in this section. The examples contain various types of mistakes, however, the authors refrained from making any corrections in order to preserve the authentic version of reflections. It should be noted that author 1 provided feedback to the students based on the errors they had made.

Student 1.
"I enjoy it a lot. It was good experience to be inside of the painting of Dali. But the second time was more close to the things im studing now. I liked more and I understand the application".

Student 2.
"The first idea is the blend of different forms of arts together, mixing the boundaries and creating a unique VR experience. Maybe while you walk through the landscape (created by paintings of famous artists) and you listen to music, the landscape will change as the music changes and forms into a new artstyle or a new artwork".

Student 3.
"Very nice experience. I felt myself immersed in the realm of virtual reality but because I have acrophobia I felt a little uncomfortable".

Student 4.
"I felt so immersed that everything else fades away, definitely I would like to repeat it again, for sure I would like to try another application and spending more time with the equipment, it is necessary".

Student 5.
"I was very excited with VR. I felt like I was in a different dimension. I left reality and I felt like I was free of my body".

Student 6.
"Based on my experience the VR puts you in an immersion situation. Where you can be creative and see things differently. I would love to repeat it. I would like to try another application like tilt brush, google earth and others. VR is something that demands time in order to get to know the equipment better and if you like to develop and take good

advantage of this new technology you need time not only to get to know it but to learn the theory of the equipment".

Student 7.
"A new source of inspiration and represent of an artwork for 21st century artists".

5 Classroom Activity Using *Dreams of Dali*

Fig. 5. Image of *Dreams of Dali.* (https://store.steampowered.com/app/591360/Dreams_of_Dali/)

The present article shows how the immersive environment in *Dreams of Dali* can pose as an instructional design tool which can increase familiarisation with course-related content in English for Fine Arts and help simulate an authentic surrealistic environment that deviates from static art-related images and passive surrealist representations of the art movement in the classroom. The authors propose the following activity based on the technological and pedagogical implementations mentioned above as well as on students' reflections. The authors follow the activity format used by Frazier, Lege and Bonner [31] (Fig. 5).

Activity: Maximising Content Learning

- **Target level**: B2
- **Time**: 90 min
- **Aims**: Students immerse themselves in *Dreams of Dali* to experience situated representations of course content and different parallel modes of meaning representation, and to practise their English language skills (writing a descriptive and argumentative text about their experience in the multimodal simulated environment using linguistic elements such as spatial adverbs, adjectives, words/phrases for expressing opinion, active and passive verbs, past tenses, comparisons, etc.)
- **Resources/materials**: VR headset, *Dreams of Dali* app, list of spatial adverbs and adjectives/ regular & irregular verbs, guidelines for writing a descriptive, and argumentative text, list of active and passive verbs, comparative/superlative guidelines

- **Possible problems**: *Dreams of Dali* offers an individual experience, but a limited number of VR headsets (either tethered or standalone) may slow down the process
- **Procedure**: This activity helps students explore parallel modes of meaning representation in Salvador Dali's surrealistic painting. Subsequently, it provides students with the opportunity to demonstrate their perception of the painting through written and oral activities.
- **Stages**:

1. The students are given lists of spatial adverbs and adjectives/ regular & irregular verbs, active and passive verbs, comparative/superlative guidelines
2. The instructor demonstrates students how to become familiar with the VR hardware and software.
3. Students are immersed in *Dreams of Dali* individually for approximately 10 min each.
4. Once the simulated experience in the surrealistic environment is over, students orally compare the various modes of meaning making they had been exposed to (see Table 1)
5. The instructor gives the students the guidelines for writing a descriptive and argumentative text, followed by a discussion with the students in class.
6. The students design (Kress, 2000) their texts and justify their linguistic choices. The instructor may interfere in the writing stage if errors are detected.
7. Based on the instructor's comments, the students write the final version of their text.
8. The students reflect on their whole experience (stages 1–7) in their diaries. The reflections may pose as a new source for language learning.
9. The students orally present their VR experience and knowledge gained in *Dreams of Dali* to the first-year students of the following academic semester.

6 Conclusions

Through the present intervening program, university Fine Arts students studying ESP were taught the surrealistic techniques of Salvador Dali through their immersive experience in the VR application *Dreams of Dali*. The students' reflections indicated that the integration of *Dreams of Dali* in the ESP lesson offered a fruitful experience as well as a positive environment in the understanding of the surrealistic properties of the artist's work. Moreover, the students' written texts (e.g., description of their experience in the VR environment) functioned as sources for language learning practice. Finally, the authors support that more in-depth results can be obtained from future research.

References

1. Kessler, G.: Technology and the future of language teaching. Foreign Lang. Ann. **51**(1), 205–218 (2018). https://doi.org/10.1111/flan.12318
2. Jewitt, C.: The Routledge Handbook of Multimodal Analysis, 1st edn. Routledge, London (2011)
3. Steuer, J.: Defining virtual reality: dimensions determining telepresence, communication in the age of virtual reality. J. Commun. **42**(4), 73–93 (1992). https://doi.org/10.1111/j.1460-2466.1992.tb00812.x

4. Häfner, P., Häfner, V., Ovtcharova, J.: Teaching methodology for virtual reality practical course in engineering education. Procedia Comput. Sci. **25**, 251–260 (2013). https://doi.org/10.1016/j.procs.2013.11.031

5. Blyth, C.: Immersive technologies and language learning. Foreign Lang. Ann. **51**(1), 225–232 (2018). https://doi.org/10.1111/flan.12327

6. Hillmann, C.: Unreal for mobile and standalone VR. Unreal Mobile Standalone VR 141–167 (2019). https://doi.org/10.1007/978-1-4842-4360-2

7. Auer, M.E., Tsiatsos, T. (eds.): IMCL 2017. AISC, vol. 725. Springer, Cham (2018). https://doi.org/10.1007/978-3-319-75175-7

8. Ogdon, D.C., Crumpton, S.: Bring the past to the future: adapting stereoscope images for use in the Oculus Go. J. Med. Libr. Assoc. **108**(4), 639–642 (2020). https://doi.org/10.5195/jmla.2020.1039

9. Hu Au, E., Lee, J.J.: Virtual reality in education: a tool for learning in the experience age. Int. J. Innov. Educ. **4**(4), 215 (2017). https://doi.org/10.1504/IJIIE.2017.10012691

10. Jauregi-Ondarra, K., Christoforou, M., Boglou, D.: Initiating meaningful social interactions in a high-immersion self-access language learning space. JASAL J. **3**(2), 86–102 (2022)

11. Boglou, D.: A simple blueprint for using oculus rift in the language learning classroom. In: 12th International Proceedings on Innovation in Language Learning, pp. 106–111, Filodiritto Editore (2019). 10.26353_2384-9509

12. Lan, Y.J.: Immersion, interaction, and experience-oriented learning: bringing virtual reality into FL learning. Lang. Learn. Technol. **24**(1), 1–15 (2020). http://hdl.handle.net/10125/44704

13. Christoforou, M., Xerou, E., Papadima-Sophocleous, S.: Integrating a virtual reality application to simulate situated learning experiences in a foreign language course. In: Meunier, M., Van de Vyver, F., Bradley, L., Thouësny, S. (eds.) CALL and complexity – short papers from EUROCALL 2019, pp. 82–87. Research-publishing.net, (2019). https://doi.org/10.14705/rpnet.2019.38.9782490057542

14. Schwienhorst, K.: Why virtual, why environments? Implementing VR concepts in CALL. Simul. Gaming **33**(2), 196–209 (2002)

15. Fowler, C.: Virtual reality and learning: where is the pedagogy? Br. J. Edu. Technol. **46**(2), 412–422 (2015). https://doi.org/10.1111/bjet.12135

16. Berti, M.: The unexplored potential of virtual reality for cultural learning. The EuroCALL Rev. **29**(1), 60–67 (2021). https://doi.org/10.4995/eurocall.2021.12809

17. Lee, E.A.-L., Wong, K.W.: A review of using virtual reality for learning. In: Zhigeng, P., Cheok, A. D., Müller, W., Rhalibi, A. (eds.) 3rd International Conference on E-Learning and Games, Transactions on Edutainment I, TEDUTAIN, pp. 231–241. Springer, Berlin (2008). https://doi.org/10.1007/978-3-540-69744-2_18

18. Parmaxi, A.: Virtual reality in language learning: a systematic review and implications for research and practice. Interact. Learn. Environ. **31**(1), 172–184 (2020). https://doi.org/10.1080/10494820.2020.1765392

19. Scavarelli, A., Arya, A., Teather, R.J.: Virtual reality and augmented reality in social learning spaces: a literature review. Virtual Reality **25**(1), 257–277 (2020). https://doi.org/10.1007/s10055-020-00444-8

20. Johnson-Glenberg, M.: Immersive VR and education: embodied design principles that include gesture and hand controls. Front. Robot. AI, **5**, 1–19 (2018). https://doi.org/10.3389/frobt.2018.00081

21. Christou, C.: Virtual reality in education, affective, interactive and cognitive methods for e-learning design: creating an optimal education experience 228–243 (2010). https://doi.org/10.4018/978-1-60566-940-3.ch012

22. The Dalí Museum Homepage. thedali.org. Accessed 06 Feb 2023

23. Sadler, R., Thrasher, T.: Teaching languages with virtual reality: things you may need to know. CALICO Infobytes, December 2021. Retrieved from http://calico.org/infobytes

24. Mills, K.A., Brown, A.: Immersive virtual reality (VR) for digital media making : transmediation is key. Learn. Media Technol. **47**(2), 179–200 (2021). https://doi.org/10.1080/17439884.2021.1952428

25. Lege, R., Bonner, E., Frazier, E., Pascucci, L.: Pedagogical considerations for successful implementation of virtual reality in the language classroom. In: New Technological Applications for Foreign and Second Language Learning and Teaching, pp. 24–46. IGI Global, Hershey, PA (2020). https://doi.org/10.4018/978-1-7998-2591-3.ch002

26. Kress, G.: Design and transformation: new theories of meaning. In: Cope, M., Kalantzis, M. (eds.), Multiliteracies: Literacy learning and the design of social futures. 1st edn. Routledge, London (2000)

27. Dawley, L., Dede, C.: Situated Learning in Virtual Worlds and Immersive Simulations. Handbook of Research on Educational Communications and Technology: 4th edn, pp. 723–734 (2014). https://doi.org/10.1007/978-1-4614-3185-5

28. Kalantzis, M., Cope, B., Chan, E., Dalley-Trim, L.: Literacies, 2nd edn. Cambridge University Press, Cambridge (2016)

29. Plastina, A.: Multimodality in English for specific purposes: reconceptualizing meaning-making practices. LFE. Revista de Lenguas para Fines Específicos, **19**, 372–396 (2013)

30. Mills, K.A.: Potentials and challenges of extended reality technologies for language learning. Anglistik **33**(1), 147–163 (2022)

31. Frazier, E., Lege, R., Bonner, E.: Making virtual reality accessible for language learning: applying the VR application analysis framework. Teach English Technol. **21**(1), 131–143 (2021)