

# Digital learning environments, multimodal and sensory affordances: reshaping the second language experience for a new era

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**Abstract.** The paper examines how the game Minecraft can be used as a new digital learning environment in the context of second language teaching and learning. It explores how the concepts of digital space and digital place within the new 3D digital environment can contribute to reshaping the language learners' experience and promote greater engagement in the target language. The study involved one language teacher and his grade 6 (upper elementary) students in a French immersion program in Canada. Digital artifacts created by the students in Minecraft were collected and qualitative analysis was carried out. The findings reveal that the use of a new digital environment allows for the emergence of a sense of digital place (emotional connection), greater engagement, and a sense of agency and control on the part of learners. Higher levels of collaboration, creativity, and imagination were also observed in the language tasks.

**Keywords:** Minecraft, digital environment, digital space, digital place.

## 1. Introduction

Digital technologies have become ubiquitous, affecting all spheres of our daily activities and providing new ways to interact with the world and communicate with others in formal and informal ways. Emergent technologies offer new digital and virtual environments, as well as multiple modalities and multisensory affordances that contribute to the evolution of the concept of traditional literacy (Pellerin, 2017). The exponential development of digital 3D interactive environments is

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**How to cite:** Pellerin, M. (2020). Digital learning environments, multimodal and sensory affordances: reshaping the second language experience for a new era. In K.-M. Frederiksen, S. Larsen, L. Bradley & S. Thouéšny (Eds), *CALL for widening participation: short papers from EUROCALL 2020* (pp. 279-285). Research-publishing.net. <https://doi.org/10.14705/rpnet.2020.48.1201>

penetrating the traditional walls of the classrooms and revolutionizing the concept of learning beyond the boundaries of the 2D textbook world (Karsenti, Bugmann, & Gros, 2017). In the last decade, studies in the field of mobile assisted language learning have examined the role of the affordances offered by new technologies in enhancing learning opportunities and the language learning process. However, the research related to the use of 3D interactive environments for second language learning at k-12 levels is still at an embryonic stage.

## 2. Theoretical background

### 2.1. Affordances of new digital environments

Gibson's (1979) theory of affordance explores the conceptualization of affordances in terms of an ecological approach to visual perception that emphasizes possibilities offered by the environment based on the perceptions of the actors. Following this perspective, the affordance of the environment or of an object is the result of the relationship between the actors and the environment/object. Norman (1999) adopted the concept in the field of human-computer interaction and focused instead on the users and defined *affordances* as “perceived and actual properties of the thing” (p. 9).

### 2.2. The role of game-based learning

Research has demonstrated that playful learning improves educational outcomes. According to Arnold (2019), games can contribute to reducing or discouraging negative behaviors, and can help to improve social skills. Digital games can contribute to the development of ‘soft skills’ such as collaboration and communication (Mohammed, 2019) as well as the problem-solving and critical thinking that are crucial literacy skills for a new digital era.

### 2.3. Minecraft as digital learning environment

Minecraft Education version is a digital 3D interactive environment that is adapted for use in the classroom (Figure 1).

According to reports from game developers, educators, and classroom research studies such as *Understanding the Impact of Minecraft in the Math Classroom*<sup>2</sup>,

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2. <https://education.minecraft.net/blog/new-study-understanding-the-impact-of-minecraft-in-the-math-classroom>

there are a number of benefits that can be realized through using Minecraft in the classroom such as:

- collaboration with peers via online social gameplay;
- engagement in problem-solving;
- learning new content from diverse subject areas (e.g. maths, science, history); and
- using creativity and imagination.

Figure 1. Picture of the Minecraft digital game (<https://www.minecraft.net/en-us/>)



#### **2.4. Transactional relationship between digital environment, digital space, and digital place**

The author examined elsewhere the multimodal and multisensory affordance offered by digital learning environments as a dynamic ecosystem (Pellerin, 2018).

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From this perspective, the digital learning environment can be understood as an organic element that is part of a larger ecological system that shapes the learning process. In the present study, the author investigates the transactional relationship between the three micro digital systems: the digital learning environment (e.g. the Minecraft platform); the digital space (e.g. the multimodal and multisensory 3D interactive environment in Minecraft), and the digital place (e.g. the digital world created by the learners in Minecraft).

### 3. Method

Exploratory and teacher action research was conducted with one experienced teacher and his grade 6 (upper elementary) students (n=26) as they used Minecraft in a French immersion program in the province of Alberta, Canada. The unit on ‘Citizens Participating in Decision Making’ lasted six weeks. The teacher’s classroom observations were recorded every day during the period allowed for the social studies. As part of the unit students were asked to work collaboratively to build a city in Minecraft that includes houses, schools, churches, hospitals, a city hall, roads, green spaces, etc.

A digital ethnography approach (Pellerin, 2017) was used to collect digital artifacts created by students while using Minecraft. The teacher, as participant researcher, collected digital artifacts (e.g. see Figure 2) created by the students as daily work in the framework of formative and summative evaluations in an authentic classroom context.

Qualitative data analysis, through an axial coding process, was used to explore the question about how the affordances of digital space and digital place within a 3D virtual environment such as Minecraft can contribute to reshaping the language learners’ experience and promoting greater engagement in the target language.

Figure 2. Some of the digital artifacts created in Minecraft Education version by the students



## **4. Results and discussion**

### **4.1. Key observations reported by the teacher**

The key observations reported by the teacher indicated:

- students showed greater engagement and enthusiasm for learning tasks in French;
- collaboration and problem-solving between students increased;
- creativity and imagination emerged in the digital artifacts produced by the students; and
- disruptive behaviors decreased.

The observed results from this small study are aligned with the results from previous research in K-12 educational context (e.g. [Karsenti et al., 2017](#); [Mohammed, 2019](#)). In the last decade, studies in the field of mobile assisted language learning have examined the role related to the benefits of using game-based learning, supporting the idea that games can improve social skills and discourage negative behavior, contributing to the development of ‘soft skills’ such as collaboration, communication, problem-solving, and critical thinking, which are crucial literacy skills for a new digital era. These results add new knowledge regarding to the use of 3D interactive environments for second language learning at k-12.

### **4.2. Insights gained from the digital documentation and students’ experience with the digital environment**

New insights were gained from the analysis of the digital artifacts created by students and the observation of the students’ experience using Minecraft in the context of second language learning at k-12 levels. The multimodal and multisensory affordances offered by the new digital environment contributed to the creation of new modes of expression, representation of thought, action, and engagement which, in turn, promotes the development of new digital skills and literacy in the context of language learning.

The use of Minecraft as a new digital environment also contributes to:

- the emergence of digital space and digital place;

- a greater sense of autonomy in the language learning task; and
- an increased motivation to use the target language as a cognitive and social tool for learning.

The research project demonstrates that within the new digital environments a sense of place (emotional connection) does emerge, providing greater control and agency over learning on the part of the learners. As a result, a greater sense of autonomy and motivation emerge toward the learning task at hand in the target language.

## 5. Conclusion

Digital 3D interactive environments like Minecraft provide new multimodal and multisensory affordances that contribute to reshaping the language learners' experience. Moreover, these 3D digital environments allow for the emergence of a sense of place in terms of emotional connection that promote greater engagement of students in the language task. Educational research has demonstrated that students' engagement is one of the best indicators of successful learning. Digital learning environments like Minecraft in the context of second language learning hold great potential in promoting greater students' engagement and, in turn, promoting successful language learning experience.

## 6. Acknowledgments

I would like to thank Gilbert Bérubé, classroom teacher, and all his students for sharing their learning experience with Minecraft.

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**CALL for widening participation: short papers from EUROCALL 2020**  
Edited by Karen-Margrete Frederiksen, Sanne Larsen, Linda Bradley, and Sylvie Thouéšny

**Publication date: 2020/12/14**

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ISBN13: 978-2-490057-81-8 (Ebook, PDF, colour)

British Library Cataloguing-in-Publication Data.

A cataloguing record for this book is available from the British Library.

**Legal deposit, France:** Bibliothèque Nationale de France - Dépôt légal: décembre 2020.