

Investigating the affective learning in a 3D virtual learning environment: the case study of the Chatterdale mystery

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Abstract. This research is motivated by the emergence of virtual technologies and their potential as engaging pedagogical tools for facilitating comprehension, interactions and collaborations for learning; and in particular as applied to learning second languages (L2). This paper provides a descriptive analysis of a case study that examines affective learning outcomes. We present an extension of an Affective Learning Model (ALM) in light of gaming in a 3D Virtual Learning Environment (VLE) in support of an L2 course. We identify affordances while applying an example of a serious game within the selected VLE. The findings of this case investigation give evidence that the gaming activities supported affective learning outcomes. This finding aligns with prior research of the ALM. Our research is based on a set of data collected during a case study as part of Euroversity, a three-year European Commission Project (2011-2014).

Keywords: virtual learning environments, OpenSim, affective model of learning, affordances, gaming.

1. Introduction

In education and language learning, the main arguments for the use of virtual technology are that 3D environments are engaging as media; facilitating comprehension, interaction, and collaboration by the means of situating learning materials in an immersive context (Roussou, Oliver, & Slater, 2006). Research

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shows that learning in VLEs is an emerging trend and can provide a more effective, motivating way of learning than traditional classroom practices (Duncan, Miller, & Jiang, 2012; Monahan, McArdle, & Bertolotto, 2008). However, VLEs on their own cannot serve as effective learning aids. Pedagogical tools and training in the use of such tools within those contexts need to be developed to meet learners' needs. More recently, the application of serious games has been studied as the use of the 'game mechanism' to facilitate the structured delivery of the learning objectives to the targeted groups of learners. Gee (2007), for instance, identified 36 principles of well-designed games that foster learning. These include fostering an environment for practice, transfer of formerly learned skills, and scaffolding of skills. In this paper, we propose these principles are expressed in the affordances of VLEs. We present an extension of an ALM in light of gaming in 3D VLE. We show evidence that the game in the VLE may offer support for affective learning outcomes for learning a second language.

2. Method

This research stems from a three-year funded network project entitled Euroversity. The Pan European multidisciplinary project (2011-2014) was comprised of 18 partners, including educators, foreign language instructors, and researchers in various fields across Europe. Practitioners strove to develop a set of supportive resources and guidelines for educators in the process of devising productive and immersive learning experiences in VLEs. Data in this paper were collected during an interview (2011) and follow-up interview (2012) on Skype with the Austrian teacher of the case study course and was recorded using the screen recording software Camtasia. Evidence in this study is identified from these interviews. We apply a descriptive analysis, examining the course of 'Chatterdale', using Robbins et al.'s (2004) ALM. We select this model because as O'Neil, Wainess, and Baker (2005), although he identified classification schemes of learning outcomes according to the cognitive learning outcomes that they support (e.g. repetitive task, memory, and exploration), speculates that research is needed on models of learning that include the affective learning outcomes. In particular, it is suggested that game elements that interact with the instructional environment may support learning outcomes. In Robbins et al.'s (2004) AML, the learning outcomes are based on constructs of *academic goals*, *self-efficacy*, *effort*, *play* and *test anxiety*.

The serious game here is also identified as an epistemic game; an epistemic game relates gameplay objectives and constructs to knowledge or the formalisation

of certain cognitive concepts within an epistemological L2 context. The game construct was an alien mystery designed to unfold in the virtual village of Chatterdale in the multi-user VLE of OpenSim. The teacher designed the virtual village by combining elements from the students' imagination and a suburban community setting. The Austrian teacher and her Norwegian colleague invited groups of thirteen-year-old Austrian and Norwegian students to explore the virtual community of Chatterdale and become acquainted with the resources of this virtual setting.

Twelve students were assigned to three groups of size four. Each group had two Austrian students and two Norwegian students. During their visit to Chatterdale, students only encountered their peers and instructors and no other persons in the VLE. This prompted them to raise the question: what happened to the residents of Chatterdale? Inspired by students' inquiries about the local residents, the teacher utilised the semiotic resources of this game-mediated setting to design game-play driven quests where students would interact and collaborate by asserting the role of local investigators baffled by the disappearance of the Chatterdale residents.

As investigators of a potential crime scene, students would collaboratively piece together clues about the disappearance of the Chatterdale residents. We extend the ALM model by introducing the third column (Table 1), proposing that affordances enacted in 3D VLEs can support the Affective Learning Constructs (ALC).

Table 1. Extending Robbins et al.'s (2004) ALM

ALC	Meaning	Proposed affordances of serious games in virtual environments that support ALC
Academic goals	Learner's actions or goal-directed behaviour	Ability to repeat training (persistence of the virtual learning context)
Self-efficacy	Learner's view of their own abilities to succeed	Dynamic view of abilities through real-time interaction with others in VLEs
Effort	Learner's extent of work on a task	Support of scaffolding through recordings of virtual sessions (e.g. machinima)
Play	Learner's actions without fear of consequences (for fun)	Control over virtual profile (e.g. supports possible actions with consequence to real-self)
Test anxiety	Learner's cognitive concern (e.g. on performance) and emotional reaction (e.g. panic)	Safe learning environment (e.g. no risk or physical harm, ability to leave emotionally stressful virtual situations)

3. Results

We identify affordances that were evident in the actual case of learning in Chatterdale and the affective constructs, as extracted from the interview data, see [Table 2](#). We find that the VLE enacted support of affective learning outcomes in L2. The interview data for this case is described in greater detail in [Hadjistassou and Molka-Danielsen \(2016\)](#).

Table 2. Affordances perceived in a case example that support ALC

ALC	Affordances perceived by the instructor of the Chatterdale case study that support ALC
Academic goals	Students' persistence in enhancing their oral skills in L2 by participating in an epistemic game to solve an alien mystery and discover the events that had transpired and that had led to the Chatterdalers' disappearance
Self-efficacy	Austrian and Norwegian high school students' capacity to succeed in solving the mystery and enhancing their oral skills in L2
Effort	Extent to which Norwegian and Austrian students strove to uncover clues and solve the alien mystery while engaging in oral interactions in L2
Play	An intriguing and entertaining game play scenario involving an alien mystery, the disappearance of the Chatterdalers. Students were invited to become private investigators to solve the mystery without any trepidation or fear
Test anxiety	Eliminated test anxiety and emotionality through the use an epistemic game and a final reflective written assignment rather than promoting other assessment techniques that would have enhanced students' anxiety

4. Discussion and conclusions

This study demonstrated that the game-play nature of the Chatterdale village generated multiple and complex affordances that contributed towards students' enhancement of oral proficiency in the target language, English. Aligning with [Zheng \(2012\)](#) and [Haines \(2015\)](#), new affordances emerged as L2 educators integrated this game-play in the VLE and students engaged and participated in constructive game-oriented interactions. The students' aim to solve the mystery pursued shared *academic goals* to complete the goal-driven task. *Self-efficacy* of students was evident in commitment in solving the mystery, and enhancing oral skills warranted their need to engage in deductive thinking, and explore and interact with the semiotic resources. In terms of *effort*, affordances were enacted during students' attempt to uncover the mysterious conditions that had led to the

Chatterdale residents' disappearance, mediated by their oral exchanges and goal-driven tasks. The *play* was based on students' personal interests, and inquiries involved imagination, mystery, crime, and private investigation in a VLE. The game-play scenario and the multiple semiotic resources, including the goal-directed tasks, enacted affordances for promoting learning outcomes, i.e. promoting oral interactions in English among students. Students did not experience any *test anxiety* since the emphasis was placed on the collaborative nature of the activity and the need to compose a collaborative reflective letter or report instead of introducing formative or summative assessment techniques that would have contributed to enhancing students' level of anxiety.

The findings of this study can guide language educators in framing and investigating the complex web of affordances within the lens of the ALM model. Educators could explore further how affordances are enacted during game-based language learning activities in VLEs based on students' *academic goals*, *self-efficacy*, *effort*, *play*, and *test anxiety*. Above all, the five constructs of Robbins et al.'s (2004) AML can guide language educators in developing a better understanding on how the affordances realised can enhance students' language learning experiences during their participation in epistemic games in VLEs. Future studies need to expand further on the complex role of ALC and address them within the situated context of epistemic games, as games are gaining more cultural and social value and popularity. This is especially beneficial in the case of game-play scenarios in VLE in L2 contexts where the game elements can be integrated constructively and effectively to promote or enhance further students' language learning experiences.

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References

- Duncan, I., Miller, A., & Jiang, S. (2012). A taxonomy of virtual worlds usage in education. *British Journal of Educational Technology*, 43(6), 949-964. <https://doi.org/10.1111/j.1467-8535.2011.01263.x>
- Gee, J. P. (2007). *Good video game and good learning: collected essays on video games, learning and literacy*. NY: Peter Lang.

- Hadjistassou, S., & Molka-Danielsen, J. (2016) Designing alien mysteries in Chatterdale: an instructor's perspective. In D. Russell & J. M. Laffey (Eds), Handbook of research on gaming trends in P-12 education (pp. 222-236). Hershey, PA: IGI Global. <https://doi.org/10.4018/978-1-4666-9629-7.ch011>
- Haines, K. J. (2015). Learning to identify and actualize affordances in a new tool. *Language Learning & Technology*, 19(1), 165-180.
- Monahan, T., McArdle, G., & Bertolotto, M. (2008). Virtual reality for collaborative e-learning. *Computers & Education*, 50(4), 1339-1353. <https://doi.org/10.1016/j.compedu.2006.12.008>
- O'Neil, H. F., Wainess, R., & Baker, E. L. (2005). Classification of learning outcomes: evidence from computer games literature. *The Curriculum Journal*, 16(4), 455-474. <https://doi.org/10.1080/09585170500384529>
- Robbins, S., Lauver, K., Le, H., Davis, D., & Langley, R. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, 130(2), 261-288. <https://doi.org/10.1037/0033-2909.130.2.261>
- Roussou, M., Oliver, M., & Slater, M. (2006). The virtual playground: an educational virtual reality environment for evaluating interactivity and conceptual learning. *Virtual Reality*, 10(3-4), 227-240. <https://doi.org/10.1007/s10055-006-0035-5>
- Zheng, D. (2012). Caring in the dynamics of design and languaging: exploring language learning in 3D virtual spaces. *Language Sciences*, 34(5), 543-558. <https://doi.org/10.1016/j.langsci.2012.03.010>

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