

The integration of an online 3D virtual learning environment into formal classroom-based undergraduate Chinese language and culture curriculum

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Abstract: This paper discusses the integration of “Second Life”, an online 3D multi-user virtual environment, into a formal classroom-based undergraduate Chinese language and culture teaching program. The paper identifies a range of limitations with the formal curriculum from the perspective of educational theory and language acquisition theory. It then goes on to discuss the theoretical mechanism by which such integration can be achieved and finally discusses the viability and benefits of integration.

摘要: 本文探讨了如何将“第二人生”这个网络三维多用户虚拟环境融入大学本科汉语语言文化课堂教学。从教育和语言习得理论出发，本文揭示了传统课程设置的系列不足并讨论了如何将“第二人生”融入传统课堂的的理论体系以及融入的可行性和益处。

Key words: 3D virtual worlds, constructivism, Chinese language learning, Second Life, task-based learning

关键词: 三维虚拟世界，结构主义，汉语学习，第二人生，任务型学习

1. Introduction

The Monash University Chinese Studies Program (CSP) is one of the largest Chinese language and culture programs in Australia, with over 800 students enrolled in any one semester. The formal classroom-based curriculum for first year beginner students provides a reasonable mix of rules-based learning, drill and pattern-based learning, and conversation practice. Implementation of the curriculum also involves a mix of teacher-centred and learner-centred learning, although the balance has generally been biased

towards the former. The curriculum provides learners with exposure to a range of linguistic and non-linguistic ‘inputs’ and with opportunities to generate ‘outputs’, but these are confined to a classroom-based, textbook-centred learning context that involves little spontaneous or meaningful communication in the target language.

2. The formal classroom-based curriculum – structure, nature and limitations

The formal classroom-based curriculum is made up of four parts: lecture, seminar, tutorial and computer lab classes.

The two-hour lecture is essentially an ‘input’ based activity focused on explanations of new grammar, vocab and content, most of which is in English. ‘Input’ in the target language is essentially limited to modelling of pronunciation and sentence patterns. Due to class numbers, time limits and class format, there is little opportunity for students to generate ‘output’ in the target language during class. The main opportunity for ‘output’ comes in the form of periodic written assessment. Lecture classes are essentially teacher-focused and a passive learning activity for learners.

While still predominantly teacher-focused, seminar classes are designed to have a higher level of interactivity. ‘Input’ in the target language takes the form of language modelling and simple instructions from the teacher and exercises in the textbook. Learners have some opportunity to generate ‘output’ in the target language, though it is often limited to reading out answers to set exercises or set passages and drill and skill type exercises. With a few exceptions, learner ‘output’ in the target language is generally only produced when requested by the teacher, and thus tends to be passive. Due to the numbers involved and time limits, not every student gets an opportunity to generate ‘output’ and receive feedback each time they attend a seminar class.

The spoken tutorials have generally provided the best opportunity for students to receive ‘input’ and to generate ‘output’ in the target language. These classes are more learner-centred, with the teacher playing more of a facilitating role, and learners working together to create and perform topic-based dialogues. ‘Input’ comes via instructions and feedback in the target language from the tutor and through interaction with fellow students. ‘Output’ in the target language is mostly limited to performance of the dialogues in the artificial context of the classroom. ‘Meaningful communication’ in the target language is very limited in that use of the language in this context is an end in itself (practicing language), rather than a means to an end (using the language to achieve something else). Again, due to numbers and limited time, not all students have the opportunity to perform their ‘output’ and receive feedback from the tutor and their peers every time.

The web-based exercises undertaken by learners in computer lab classes, while very much learner-centred, have in the past generally not been well received by students. As interaction with fellow learners and the teacher is limited, students have expressed a preference for doing these exercises in their own time.

3. Questions for consideration

The limitations of the formal classroom-based curriculum for first year Chinese language and culture students described above have thus raised several questions. How could the formal classroom-based curriculum be made more learner-centred and better reflect widely accepted educational principles such as those of constructivism? What opportunities for ‘meaningful communication’ in the target language could be created within the formal classroom-based curriculum? If, as proposed by a number of language acquisition theorists, the role of ‘comprehensible input’ (Krashen, 1985) and ‘comprehensible output’ (Swain, 1985, 1995) is essential to the language learning process (see discussion below), how could more of these two elements be incorporated within the formal classroom-based curriculum?

In an attempt to answer these questions, it was decided that the computer lab classes would be used to conduct lessons in the 3D online virtual world Second Life. In 2007, Monash University purchased its first ‘region’ for general educational and research use¹. In 2008, after the purchase of a ‘region’ dedicated to the learning and teaching of Chinese language and culture², first year and third year undergraduate students began classes in Second Life as an integrated part of their formal classroom-based curriculum.

4. Second Life as an online 3D virtual learning environment

Recent years has seen a continual growth of interest and investment of time and resources in 3D simulations, games and virtual environments for teaching and learning across a broad range of disciplines and institutions (Dalgarno & Lee, 2010; Henderson, Huang, Grant, & Henderson, 2009). Educators and educational institutions around the world see great potential for these platforms as 3D virtual learning environments (3D VLEs) that provide the possibility of rich learner engagement, as well as the ability to explore, construct and manipulate virtual objects, structures and metaphorical representations of ideas (Dalgarno & Lee, 2010).

Second Life is one of over 250 online virtual worlds (Ciaramitaro, 2008; Henderson, et al., 2009). An online virtual world is a three-dimensional graphical space that resides on a computer server(s) connected to the Internet and accessed via three-dimensional graphical representations of the users (avatars). While often perceived of as being similar to 3D computer games or massively multiplayer online role-playing games, some virtual worlds like Second Life, Croquet, Project Wonderland, Olive, Active Worlds, web.alive, etc., are not per se games (Ondrejka, 2008). They do not have pre-set game rules, objectives, roles and environments, but rather are flexible 3D virtual spaces that can be, to a lesser or greater degree, configured by the users themselves to suit their specific needs. These needs can be game-like, but are increasingly oriented towards social networking, education and training, and business (Ondrejka, 2008; Salt, Atkins, & Blackall, 2008).

While not unique to virtual worlds, there are two other important affordances offered by these online spaces. The first is the high level of synchronous interactivity (via text and voice chat, gesture and movement) that greatly facilitates peer-to-peer and student-to-instructor real-time interaction regardless of actual physical location of the participants. The second is the potential for asynchronous interactivity via persistent digital objects such as whiteboards, bulletin boards, slideshows, notecards and programmed non-player characters, which the learners/avatars can interact with even though the ‘owner’ is absent or offline (Henderson, et al., 2009). It is this high level of synchronous and asynchronous interactivity and configurability of the virtual environment that has provided a unique opportunity for meaningful communication in the target language and for creating an environment rich in ‘comprehensible input’ and ‘comprehensible output’ for the first year Chinese language and culture students at Monash University.

5. Constructivism – three perspectives

In a paper entitled *The Potential of 3D Virtual Learning Environments: A Constructivist Analysis* (2002), Dalgarno summarises and re-casts Moshman’s discussion of three broad approaches to constructivist learning. Moshman calls these approaches endogenous, exogenous and dialectical constructivism (1982). Each approach is underpinned by several basic principles at the heart of constructivism: knowledge is actively ‘constructed’ by the learner and not simply passively absorbed; new knowledge is constructed on the foundation of, and at times in contrast with, existing knowledge and experience; each learner constructs knowledge in their own way.

The three approaches differ in terms of the locus of learning. In the exogenous category “knowledge is derived from one’s environment” and is a “reconstruction of structures (empirical relationships, presented information, observed behaviour patterns, etc.) pre-formed in the external reality” (Moshman, 1982, p. 373). For endogenous learning, the “locus of activity in the construction of new knowledge is ... the organism rather than the environment” (1982, p. 374). In other words, new knowledge is developed through “a reflective abstraction of new structures via intercoordination of, and/or metacognitive reflection on, current structures” and not via an “empirical abstraction of information from the environment” (1982, p. 374). Dialectical constructivism involves, as the name suggests, “continuing interactions between organism and environment”. “New knowledge is a constructed synthesis which resolves the inevitable contradictions arising during the course of such interactions” (1982, p. 375). Interaction with the environment clearly includes social interaction with peers and instructors (and others in society in general), and indeed it is this social interaction as the source of new knowledge that forms the core of many of the modern applications of constructivist learning theory.

We would argue that with the addition of interactive lessons in a 3D virtual learning environment like Second Life these three perspectives can be effectively combined within the overall structure of a formal language and culture curriculum with large class sizes to address some of the limitations of the existing curriculum outlined

above. Indeed, Moshman sees exogenous and endogenous learning almost as a subset of dialectical constructivism, and certainly argues for a partial integration of the three paradigms (Moshman, 1982).

6. Integrating Second Life into the formal classroom-based curriculum

6.1 An educational perspective

Integrating learning in a 3D VLE like Second Life into a formal undergraduate language and culture curriculum is one way of effectively bringing together the three constructivist paradigms and addressing some of the limitations outlined above. Lectures provide the structures “pre-formed in the external reality” by presenting the rules of the target language and examples of those rules in action, and are thus of an “exogenous” nature. Seminars provide “exercises requiring the learners to be cognitively active” and to “form and refine their knowledge representations” through formal pattern exercises (Dalgarno, 2002), and are thus also mainly exogenous in nature. We would argue that the speaking-based tutorials fulfil the requirements of endogenous constructivism as outlined by Dalgarno in that the role of the tutor is as a “facilitator in providing experiences that are likely to result in challenges to learners’ existing models”(2002, p. 2). The experiences are the topics set for the dialogues that students create and perform, with the challenges coming from both the linguistic and cultural content inherent in each topic, as well as the instructive feedback provided by the tutor. We would argue, however, that the tutorials only fulfil the requirements of dialectical constructivism outlined in Dalgarno in a ‘weak’ form in that the dialogues performed by students are (a) not ‘meaningful communication’ and (b) out of context, and therefore not realistic. The collaboration engaged in by students is essentially limited to the construction and performance of artificial dialogues and is usually restricted to pairs. We would thus argue that this is a ‘weak’, and ergo inadequate, form of dialectical constructivism.

This is where we see a role for the task-based learning undertaken by students in Second Life in completing the picture/framework. The tasks undertaken by students in their lessons in Second Life fulfil the requirements of dialectical constructivism (and thus comply with the basic principles of constructivist learning) in a ‘strong’ form by facilitating broader and deeper collaborative work and by providing a realistic, meaningful context for the use of the vocabulary, grammar and cultural knowledge learned in the lectures, seminars and tutorials. Because tasks are performed in a context that generally reflects the context of the real world and in an environment that simulates the real world with a reasonable degree of fidelity³, engagement in and completion of the tasks do provide “realistic” (Honebein, Duffy, & Fishman, 1993) and “authentic” experiences (Lebow & Wager, 1994; Reeves, Herrington, & Oliver, 2002; Weasenforth, Biesenbach-Lucas, & Meloni, 2002). Opportunities for ‘comprehensible input’, ‘comprehensible output’, and ‘meaningful communication’ are also thereby increased greatly. We would argue that this is a ‘strong’ form of dialectical constructivism.

6.2 A language acquisition perspective

‘Comprehensible input’ is a hypothesis first proposed by Stephen Krashen (1982). He purports that language learners acquire language by hearing and understanding messages that are slightly above their current second language level. In everyday contexts the degree to which ‘input’ is comprehensible is extremely variable. The multiple information channels available in 3D VLEs like Second Life enable the level of ‘input’ to be better tailored to the comprehension levels of specific groups of learners than is possible in similar contexts in real life. What a learner might not understand from text-based information might be better understood from visual observation of the surrounding environment or through interaction with objects in the environment (clicking an object to hear an audio file for pronunciation) or agents within the environment (other learners, automated non-player characters).

We would argue that Krashen’s concept of $i + 1$ is not incongruous with the Piagian idea embodied in exogenous constructivism of learning being seen as “fundamentally an accommodation of the organism’s prior structures to those imposed by its current environment” (Moshman, 1982). In Krashen’s formulation of $i + 1$, “ i ” includes extra-linguistic “knowledge of the world and of the situation, that is, the context” (Wikipedia, - Comprehensible Input). Thus, ‘comprehensible’ input’ includes both linguistic and contextual information. The content of our Second Life lessons is based closely on content students have previously encountered in their textbooks. When designing the task scenarios, in addition to incorporating as much material as possible that students are already familiar with, extra linguistic and contextual material drawn from real life scenarios is also incorporated. Learners thus construct new knowledge and structures through using existing knowledge and structures to explore and interact with the multi-channel ‘input’ they encounter when completing the set tasks.

Developed by Merrill Swain (1985, 1995), the ‘comprehensible output’ hypothesis states that learning takes place when encountering a gap in the linguistic knowledge of the L2. By noticing this gap the learner becomes aware of it and might be able to modify their output so that they learn something new about the language. Although Swain does not claim that comprehensible output is solely responsible for all or even most language acquisition, she does claim that under some conditions, ‘comprehensible output’ facilitates second language learning in ways that differ from and enhance input due to the mental processes connected with the production of language (production forces learners to pay some attention to form and to process syntactically). Swain defines three functions of output: 1. **Noticing function:** Learners encounter gaps between what they want to say and what they are able to say and so they notice what they don’t know or only know partially in this language. 2. **Hypothesis-testing function:** When a learner says something there’s always a hypothesis behind it e.g. about grammar. By uttering something the learner tests this hypothesis and receives feedback from an interlocutor. This feedback enables them, if necessary, to reprocess his hypothesis. 3. **Metalinguistic function:** Learners reflect about the language they learn and hereby the output enables them to control and internalize linguistic knowledge.

Again, we would argue that Swain's concept of 'comprehensible output' correlates well to the principles of constructivist learning. The task-based learning that takes place in Second Life provides excellent conditions for the implementation of each of the three functions outlined by Swain. As in real life, learners are required to interact with the 3D VLE and the objects and agents within it to complete the set task, giving them the opportunity to test linguistic and non-linguistic knowledge learned in the classroom (Harris & Graham, 1994) and receive direct and immediate feedback as a consequence of their 'output'. In the case of our Second Life lessons, failure to produce 'comprehensible output', to communicate appropriately, can lead to a learner being unable to move towards completion of the set task. In order to move forward, learners have re-assess their communicative strategy ('notice' where any gaps in communication might exist) and develop a new strategy that will enable them to continue to progress to the end of the task.

The communication engaged in by the students in the target language is 'meaningful' in that it is a means to an ends, which in crude terms is the completion of the set task. In the process of completing the set task, students are required to explore and understand information provided in written, graphical and/or auditory form and through the surrounding environment in teams, and are thus exposed to a variety of meaningful 'inputs' that contribute to the forming of new knowledge essential to completing the task. They in turn have to generate meaningful 'output' as part of their interaction with their peers, teaching staff, a range of digital artefacts that form part of the environment and the lesson, and with the non-player characters imbedded in the environment.

7. Student-focused learning in Second Life – an example

In the constructivist view of learning, collaborative work is important with 'learners working together and developing their understanding of concepts through a social learning process' (Dalgarno, 2002). From the very first lesson on basic Second Life skills, our first year Chinese language and culture students are asked to form teams, and indeed the process of forming teams itself becomes a step in their acclimatisation to the virtual environment and to interacting with their peers.

One lesson in Second Life requires learners to complete two tasks. Students are divided into teams using a system of coloured flags that resemble ancient Chinese battle flags and are required to wear coloured team T-shirts for easy identification. To complete the tasks in time and successfully team members need to work together closely. The tasks consolidate previously learned vocabulary and concepts as well as introduce learners to new linguistic and non-linguistic information. Completion of each task requires a combination of reading textually-based information, listening to audio-based information, visually scanning the virtual environment, conducting conversations with automated non-player characters ('bots') and interacting with automated objects in the environment (e.g. restaurant menus, automatic ticket selling machine, air conditioners, etc.). The role of the teachers is (a) to create the environment / task / instructions /experience (b) scaffold

learners as they work towards completion of the task and (c) confirm that learners have successfully completed the set tasks.

The first task involves purchasing a train ticket to Beijing from the Chinese Island railway station. Each team of students is provided with a different set of criterion (purpose of travel, budget, desired arrival time) which determines what ticket they should buy. Success is measured by purchasing of the correct tickets for the whole team (the tickets can be visually inspected by the teacher). The second task involves enquiring about long-term accommodation for a foreign student studying in China. Teams are given the address of a real estate agent on the island and a list of information they have to gather. Visual inspection of potential accommodation is also required. Success is measured by answering a series of questions with correct information.

The advantages of this kind of team arrangement are obvious. Firstly, it puts the students at the centre of the learning process. Secondly, with more experienced student-mentors in each team to take care of many of the problems encountered and to keep the teams moving, the teachers are to some extent freed up to move amongst the learners, both virtually and in the computer lab, and provide more individualised assistance as required. Help from more experienced team members and individualised attention from the teachers enables better activation of learner's ZPD (Zone of Proximal Development), which Vygotsky defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (1978, p. 86). Thirdly, the forming of teams facilitates the socialisation and peer-to-peer communication process. Fourthly, it makes the teacher's task of managing and keeping track of a large number of learners a good deal easier.

8. Student feedback

A post-lesson survey was carried out on 112 first year Chinese language and culture students after one lesson in Second Life in 2009 focused on familiarising them with the environment and the skills necessary to function in the environment. The survey focused on the question of whether or not students saw learning Chinese in Second Life as an 'acceptable' mode of learning, and in particular, whether they felt there was any benefit from the type of collaborative learning advocated by dialectical constructivism and outlined above. Analysis of the survey data has clearly shown that students are on the whole comfortable with the platform/environment and importantly, 90% of students surveyed felt that they benefited from collaborative interaction with the other members of their group during completion of the set task (see Table 1 on next page).

Table 1: Results from Student Survey

Question	Results				
1. How much access do you have to a computer at home / where you spend most of your time?	Very limited	Limited, but enough to do what I need	As much time as I need		
	7.1% (8 people)	26.8% (30 people)	66.1% (74 people)		
2. Do you have a fast broadband Internet connection (at home)?	None	Excruciatingly slow - even pages of text take a long time to load onto my screen	Slow - text loads but I have to wait for images to appear	Medium - I don't have to wait for pages too often but videos and other large files take a while	Fast - I rarely have to wait for files (including watching long you tube videos)
	2.7% (3 people)	1.8% (2 people)	5.4% (6 people)	59.8% (67 people)	30.4% (34 people)
3. Have you spent time in a 3D virtual world or played a 3D game with an avatar before?	Never	A few times	Many times	Frequently	No response
	44.6% (50 people)	36.6% (41 people)	11.6% (13 people)	5.4% (6 people)	1.8% (2 people)
4. Did you find mastering the basic skills (for example flying, zooming your camera, 'wearing' clothes and other items, etc.) difficult?	Very difficult	Difficult	Easy	Very easy	No response
	2.7% (3 people)	22.5% (25 people)	56.8% (63 people)	18% (20 people)	0.9% (1 person)
5. Do you feel comfortable in the Second Life 3D environment?	Very uncomfortable	Uncomfortable	Comfortable	Very comfortable	No response
	0% (0 people)	18% (20 people)	65.8% (73 people)	16.2% (18 people)	0.9% (1 person)
6. Was having peer support helpful learning the basic skills?	Not relevant	Only sometimes	Most of the time	All of the time	
	8.9% (10 people)	2.7% (3 people)	49.1% (55 people)	39.3% (44 people)	

In order to establish a base-line for measuring the level of comfort or otherwise students might have with learning in the Second Life environment from a technical / skills perspective, a number of questions were asked about access to computers and the Internet at home, previous experience with similar virtual environments and actual perceived level of difficulty in mastering skills specific to operating within the environment. The majority of students appear to have relatively good access to computers and the Internet at home (66.1% and >90%) and thus were reasonably familiar with both these basic requirements for using an online 3D VLE. Despite the majority of students having had little or no contact with similar virtual environments previously (approx. 80%), over 70% did not find mastering basic skills necessary for engaging in learning in the Second Life environment difficult to master and over 80% felt 'comfortable' in the environment. With respect to the collaborative nature of the environment and the tasks concerned, over 90% of students felt

that scaffolding provided by peers was indeed helpful, which is consistent with the dialectical constructivist view of learning.

A second survey was carried out after a lesson on eating in a virtual Chinese restaurant which focused on the issue of what the students themselves thought was their biggest gain from the specific lesson in Second Life. Detailed findings have been published in the conference proceedings of the 8th International Conference on Chinese Language Pedagogy held in Kunming, China in June 2010, however, it should be noted that a significant number of students (approximately 50%) believe that they benefited from the lesson not just in terms of linguistic knowledge, but also in terms of having had a realistic linguistic and cultural experience that linked classroom-based learning with real life (Huang & Grant, 2010).

Another important measure of the efficacy of language and culture learning in 3D VLEs like Second Life Further is that of self-efficacy. In 2009 a research project was conducted that aimed to explore the proposal that a language lesson in Second Life could sustain or improve students' self-efficacy beliefs through learning activities favouring selective language performance. The quantitative results from the pre and post questionnaires supported the research proposal by indicating a statistically significant increase in student' self-efficacy beliefs in using Mandarin in real-life Chinese settings (Henderson, et al., 2009). Further follow up research is planned for 2010.

9. Conclusion

Over a period of a number of years, faculty engaged in the teaching of Chinese language and culture to first year undergraduate students at Monash University observed a number of pedagogical and logistical limitations in the formal classroom-based curriculum. The curriculum was perceived to be overly teacher-focussed. Due to the structure of the curriculum and large class sizes, inadequate opportunities were available for students to construct new linguistic and non-linguistic knowledge and skills in other than classroom-based and textbook-based contexts. In particular, few opportunities were available for learners to engage in meaningful communicative activities based in realistic contexts that could potentially consolidate existing knowledge and generate new knowledge.

In 2008 the decision was made to incorporate learning in the rich online 3D virtual environment of Second Life as one way of addressing these issues. Since then over 400 hundred Monash Chinese language and culture students (first and third year) have undertaken Chinese language and culture lessons in Second Life and these lessons are ongoing. Formal and informal feedback from students has shown that these lessons are popular and have gone some way to addressing the limitations outlined. However, the authors believe that further research is needed to look at issues such as the effectiveness of learning in such an environment in terms of language and culture learning outcomes and the transferability of linguistic and non-linguistic knowledge and skills learned in the virtual environment to the real world environment.

Notes

1. The original Monash region in Second Life can be accessed by entering the following URL into a standard Web browser, after which a separate page will be opened with a link to the region: secondlife://monash%20university/123/136
2. The Monash region in Second Life dedicated to teaching Chinese can be accessed via the following URL: secondlife://monash%20university%202/83/89/26
3. For a more detailed discussion of ‘fidelity’, see Dalgarno and Lee (2010).

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