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# Using Virtual World Platform for Language and Critical Thinking Skills, Learning and Practice

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## Abstract

*Digital natives of today need frequent stimuli and a variety of activities to keep them engaged and connected in the learning process. With the availability of web 2.0 technologies and its impact on the mode of online interaction and networking, they are highly dependable on the informal social media or technologies to make meaning of the world around them and to voice their opinions. The educators of today thus, face the challenge of incorporating informal media or technologies in the formal lesson delivery setting, in order to close the digital divide within, so as to actively engage them. On the other hand, the incorporation of the ICT tools should not be focused on a teacher-centered approach, but more importantly to leverage these affordances to support learner or student-centered practices.*

*Critical thinking, in particular, taking multiple perspectives, is an important component in the teaching of Chinese Language in Singapore. To entice the student to understand, practice and develop multiple perspectives skills in the use of their Mother Tongue language, the classroom setting must include the use of digital media to motivate them and ICT tools that facilitate discussions so that the students are cognitively engaged.*

*Literature on using Virtual World immersive environment for educational purposes have highlighted on the high possibility of implementing learner centered pedagogies to provide a 3-Dimensional (3D), interactive, avatar-based collaborative learning and practice for students. Leveraging on the affordances of the immersive platform, our educational metaverse provided immersive experiences, authentic contexts and activities for experiential learning and role-play for students to practice on their multiple perspectives taking and language skills. This paper will share the core findings on the concept behind the pedagogical and content design, implementation, challenges, adaptations and recommendations for a 3D virtual world environment for language and critical thinking learning and practice in a Singapore secondary schools context.*

## 1. Introduction

Research suggests that Virtual World (VW) learning environment "enhances student engagement through a sense of shared experiences, offers opportunities for collaboration, and provides access to information about the virtual environment and user created content" [1]. With the nature of interaction changing in a Web 2.0 environment and 'digital natives' [2] growing highly dependable on new media to make meaning of the world around them, a "key challenge is to overcome traditional barriers to integrating the informal media that young people love into the more formal settings of schools" [3]. Evidence of "a link between twenty-first century skills and academic achievement making the case for incorporating teaching activities that adhere to twenty-first century skills" was reported [4]. This paper focuses on exploring and ascertaining the use of VW platforms in Chinese Language (CL) teaching and learning to foster higher order thinking skills (HOTs) and 21st Century Competencies (21CC), such as collaborative skills.

## 2. Background

In 2009, a team was formed to explore the application of Second Life as an immersive 3-D platform to teaching and learning. CL, one of the four Mother Tongue Languages (MTL) offered in Singapore schools, was selected for the study.

### 2.1 External scan of the metaverse environment

External scans showed that VW application at secondary level or K7 to 10 were limited. Most of the meta-verses created and managed by educators were for the varsity students or adult learners, in which "more than 400 universities in SL and there are more than 4000 teachers on our education mailing list" [5] and past studies on VW done at various settings indicated a 69% at polytechnics and university, followed by secondary schools (19%) and primary schools (12%). Moreover, among 8 identified disciplines of study, frequency use of VW in "language (e.g. English as a foreign language)" records a 6.3%" [6]. The limited reference available may also be attributed to the inaccessibility of SL Teen Grid where most of the educational activities are conducted.

### 2.2 Internal scan of MTL learning and teaching

Internally, the characteristics and objectives of Singapore's MTL teaching and learning are also taken into account in exploring VW affordances. Firstly, the key outcome in teaching and learning MTL is to "enthuse and enable our young to become proficient MTL users so that they will use their MTL as a living language in and out of school" [7]. Students are expected to communicate confidently and critically, in both written and spoken form. To further shape this unique characteristic of MTL, majority of the student cohort takes the MTL as a second language, and this is rather different from the usual disciplinary definition in other countries.

MTL learning carries a values-based role in not only appreciating our rich cultures but at the same time a key element in maintaining the bond within each community and also the society as a whole. This is definitely different from the learning of CL as a second language in most countries. In a nutshell, the bilingual education that shapes this multi-lingual and multi-cultural society can be summarised in such a way that , "English, as the common language of instruction, enables our students to plug into the globalised world, while learning mother tongue languages enables our students to have a sense of identity, and connect to our Asian cultural values and heritage" [8].

### 2.3 Need to provide opportunities for HOTs and 21CC

The competencies and skills that our students need to possess in order to work productively in innovative professions and organisations would require "the educational system to provide the necessary supporting environments, practices and assessments to meet the expectations of the 21st century" [9].

In Singapore, there is a emphasis on student-centred learning in order to prepare citizens for 21st century competencies [10], in which the "access to education, the capacity to learn, a disposition for lifelong learning, competencies in communication and collaboration in knowledge creation activities are becoming increasingly important for participation in a socially and culturally diverse world" [11].

Recommendations also highlighted the use of Information and Communication Technology (ICT) should be leveraged upon to extend students' learning beyond the classroom and facilitate a better understanding of the subject or a concept. It is also highlighted that use of ICT allows for "greater interaction between students and teachers through real-time communication" and an increased usage of "new technologies encourages self-directed learning and trains students to be independent learners, a neccessary skill for the future" [12].

Hence, against this backdrop, the design of the pedagogical and lesson delivery approach was crafted with the following guidelines:

1. Realignment of teaching and learning strategies in the lesson design so as to cater to the language learning and cognitive needs of secondary school students;
2. Refinement of teaching and learning approaches so as to cater to the study design of the project;
3. Learning tasks will facilitate the collaborative learning (CoL) and self-directed learning (SDL) among students.

## 3. Methodology

This paper on designing VW CL lesson is part of a pilot study to assess the impact and pedagogical effectiveness of VW.

This quasi-experimental design study involves 161 secondary two students (14-15 years old) from 5 schools. Participants were briefed on the objectives and scope of the study. A workshop was also conducted for the Academic Heads and teacher participants to impart the pedagogy and technical skills for effective delivery of VW lessons. During the workshop, teachers were engaged to discuss and refine the lesson plans. Implementation was a 7-weeks intervention with lesson packages designed for both control and experimental classes.

## 4. Lesson design

The approach to the design of VW based CL lessons can be elaborated in 3 aspects. In each aspect, a descriptive format is adopted to share how this is done in a non-ICT based lesson and a refined version with the use of VW:

### 4.1 Curriculum content and skills integration

In bridging the CL core curriculum and infusion of ICT, hot topics discussion was chosen. This segment aims to harness students' language expression and critical thinking skills. Critical thinking here refers to "thinking which entails self-improvement" and "by which one appropriately assesses thinking" [13]. The association between critical thinking and language learning is based on that "the reflective mind improves its thinking by reflectively thinking about it. Likewise, it improves its reading by reflectively thinking about how it is reading. It improves its writing by analyzing and assessing each draft it creates". In other words, "if we learn how to think critically, we can reflect our minds and our minds will reflect our reading and writing skills" [14]. The rationale for this approach is to engage students in the use and practice of language and critical thinking, in particular analyzing, evaluating and multi-perspective taking skills. From the MTL secondary curriculum perspective, this sets the foundation for learning and mastering expository writing skills at upper secondary level.

The non-ICT based practice of CL teachers for hot topics discussion is facilitated by group discussion and sharing by group representatives on the views generated using given topic-related materials. Discussion and presentation of views may be guided by a thinking routine or in open format.

In designing the VW CL lessons, the exposure to learning content is facilitated through the in-world exploration time whereby student avatars immerse ang interact with learning objects. To facilitate cognitive learning objectives, learning tasks in this experiential learning requires students to gather observations done through their exploration, organise and consolidate their views using a thinking routine. In addition, roles are given to facilitate perspective taking skills and this is further reinforced by a co-operative strategy of jig-saw learning, to offer another round of idea sharing to build on the views generated through the event-based group discussion.

### 4.2 Engagement of Learning

To facilitate engagement of learning, it is important that learning tasks designed are based on authentic learning context [15]. The engagement comes only not through the relevance of the content involved, the objectives and process in which the learning task is carried out will have an impact on the level of engagement. The Total Participation Technique Cognitive Engagement Model [16] highlighted the essential component to ensuring "deeper learning" is to create "classroom opportunities for developing higher order thinking skills" and "engage children in thinking through the implications and the relevance of the content to their world" .

A non-ICT lesson to facilitate hot topics discussion with deeper learning is to engage students with authentic tasks through role-play. Based on the topic, primary and secondary roles are assigned to students. The primary roles include characters directly involved in the incident such as victims, persons that have direct relations with the victims; and secondary roles include professionals such as social worker, educators and psychologists. Each member of a group will be assigned a role and the task will be to discuss and come out with views to facilitate a role-play between the journalist and all other roles. Students are also equipped with thinking routine such as the 5W1H (What, Who, When, Where, Why and How) for discussion to provide opportunities for them to develop HOTs.

VW CL lesson design build on the engagement of learning by leveraging on the 3-Dimensional (3-D) technology affordance to enhance the task-based experiential learning. Students work with their group members to draft the scripted dialogue between journalist and roles based on a contemporary topic. Through this process, students were engaged not only through role-play in the immersive environment and embodied representation of the roles, but at the same time engage in authentic discourse. In completing the learning task, students' in-world exploration and interaction are carried out in the first person account. In their avatar form, students explore and interact with learning objects through their sensory of sight and sound. After the exploration, teachers will then scaffold learning by eliciting students' views. Students will then move into pre role-play group discussion in designated virtual space and costumes. This facilitates the practice of perspective thinking which is guided by a thinking routine. Before the in-world role-play, the lesson design also leverage on the convenience of teleporting by reorganising students into expert groups for jig-saw learning. Last but not least, each VW CL lesson was also designed intentionally to comprise 2 segments, namely teacher explicit teaching time and students' hands-on time, to support the student-centred activities.

### 4.3 HOTs and 21CC

Research has highlighted that designing 21CC based lessons should take into consideration "the stage of readiness for Self-Directed Learning, and provide scaffolds and learning guidance based on the learner's needs to help them learn effectively" (Tan, et al., 2011). In lessons to foster Collaborative Learning (CoL), students have "multiple opportunities to shape and reshape the emerging collective understanding about the topic" (Chai, et al., 2011). Therefore, teachers need to "ascertain readiness of the learners and the learner's experiences for classroom teaching and learning" (Tan, et al., 2011).

A non-ICT based lesson to provide opportunities for students' demonstration of HOTs is to facilitate discussion using questions that guides them to analyse, evaluate or create. For 21CC, group work is a common mode deployed to engage students in case study discussion and dividing the problem into segments for assignment to various groups. The consolidation of learning will then be a teacher-centred one, where groups or individuals share their answer or group views for teacher's refinement and endorsement.

In the VW CL lessons, the difference is that the thinking skills (multiple perspective taking) introduced to facilitate the demonstration of HOTs (analyse and evaluate) are integrated in the learning task. In other words, in preparing for the role-play, students are involved in a 2 tier discussion within event-

based group and that of expert group in jig-saw learning. Moreover, the opportunities for students to demonstrate 21CC such as SDL and CoL are also provided. Through collaborating with their peers to build on each others' ideas through the discussions, the students will also practise communication and interpersonal as well as time management skills, all of which are important components of 21CC. Finally, there is also a teacher-facilitated de-brief of the lesson where students share learning points and the justify their views.

## 5. Findings

The findings after a 7-weeks implementation period over 2 topics are presented as follows:

### 5.1 Curriculum content and skills integration

The general feedback by teachers and students on the integration of the VW platform with the hot topics discussion is positive. Qualitative feedback from students indicated that VW helped in their learning:

- "In my opinion, i feel that this form of attending Chinese lessons, or maybe other subject lessons is an ejoyable and fresh way of enganging [sic] the students. It also enables us to interact with our classmates and teachers simultaneously through the Virtual World, which improves on discussions and different from the usual kind of lessons conducted";
- "it benefitted [sic] me as i've improved my communication skills and i learnt how to speak up and explain my views on the difficult situations that we were given" ;
- "I think my answering skills have improved, and i was able to look from different perspective, different point of view" ;
- "The topics covered during these lessons are interesting such as the Oil Spill topic that tells us [sic] about real-life situations and we are then able to discuss the cause and effects online effectively";
- "I was able to connect ideas better than in a traditional lesson. I was able to think of more ideas";

Teachers also provided positive feedback that students find the VW platform refreshing and interesting and they are motivated to learn during these lessons. They have also shared strategies on further lesson refinement.

### 5.2 Engagement of Learning

Qualitative feedback from students and teachers of the experimental class indicated that the VW provided shy students a platform to voice and express their thoughts and ideas. Most importantly, their voices were heard and responded instantaneously in a visual (avatar) form. The visual appeal, such as navigating in a realistic immersive environment, the physical embodiment of the roles, including the articulation of their views in chat logs, did help to engage and motivate these digital natives to voice their view points. Excerpts from students' feedback included:

- "The conditions on the beach, such as the dead trees and animals, also gave us a better idea on the effects on an oil spill, and this helped us a lot in coming up with the effects and solutions for the problem. The things in the 3D environment did indeed help us learn better as compared to the textbook";

- "The details provided by the environment and objects in Second Life lessons make me think more [sic] deeply about the things we learnt because the environment gives me the idea about the topic and I can say things from the environment given instead of imagining the topic";
- "Also, being the role of different characters and a 3d like environment you get to feel how it is to be a victim or a witness of an event so as to understand it";
- "It allowed us to act in different characters we would never be in real life";
- "I like the part whereby we gather in group in our respective roles and do jigsaw learning, this enables us view things [sic] in a different perspective and understand their point of view";

Teachers shared their observation on the quality of discourse content provided by their students. Strategies on better management of student in-world activities are proposed to facilitate better time management of lesson activities.

### 5.3 HOTs and 21CC

Last but least, students also highlighted the benefits of the VW CL lessons in providing opportunities in collaborating as a group and building on one another's ideas:

- "i do have more opportunities to work together with my group as the question that we need to do or anwser needs us to work together as a group";
- "i feel that it gave me meaningful lessons by doing the task on time and understanding how to answer questions using the 5W1H to complete virtual world";
- "the second life lessions were intersting [sic] enough to made me go and find out more about the topic on my own.I am able to manage my time better than before while getting the tasks done";
- "i think that this is beneficial as it makes students more inquisitive.....";
- ".....we did come out with better ideas as we listen to each other classmate feedback and came out with better ideas";
- "Second Life lessons are quite interesting in a way that .....this could better enhance our imagination and change the way we think . Examples are, vandilism [sic] under the HDB block . Before the Second Life lesson , we would only think that it would affect the way foreigners look at us. Now, we would know that it would also affect the residents living there";

Teachers have indicated that the use of VW platform to harness the students' multi-perspective thinking is apt and essential. They have also suggested recording quality role-play for demonstration to facilitate consolidation of learning.

## 6. Conclusion

In summary, this paper aims to share the reflective thought process in designing and implementing a secondary school CL lesson that incorporates VW technology. While this intermediate report shares the perception based student feedback to the blending process which involves the technology, pedagogy, content and knowledge domains, there are recommendations to complement this work-in-progress study:

Analyse chat logs of the experimenting classes throughout the 7 week intervention;

Implement a longer intervention period with more topics;

Include oral based discussion to complement the text-based discussion.

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