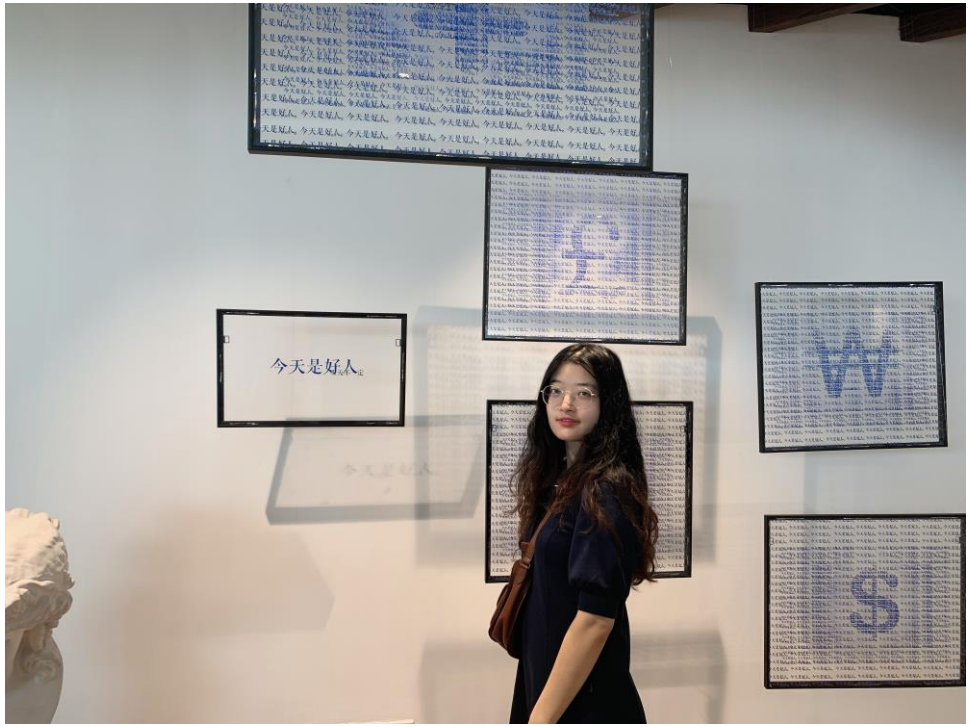
Digital Transformation from Traditional Education Towards VR Education : Case Study Plans

Luxia Dong
Curriculum and Teaching Methodology
Beijing Language and Culture University
Beijing, China
dongluxia1992@163.com

Author: Luxia Dong

I am a student majoring in Curriculum and Teaching Methodology at Beijing Language and Culture University.



As Virtual Reality (VR) technologies have become popular and democratic in recent years, academic researchers have been exploring ways to employ advanced VR technologies in traditional education and edutainment.

Related work

Many recent research works have focused on VR education and VR training. Some examples include:

- children education proposed by Roussou et al. [1]

- immersive virtual reality museum educational tool proposed by Huang et al. [2]

- and virtual reality-based rehabilitation training applications for people with intellectual disabilities developed by Standen et al. [3].

Related work

In addition,

Matsentidou et al. [4] developed a VR application for training and enhancing the social skills of children with autism through immersive visualizations in a VR cave environment,

Webster et al. [5] proposed an immersive virtual learning environment for corrosion prevention and control training,

Chang et al. [6] proposed an immersive virtual environment for foreign language teaching

Related work

Bastiaens et al. [7] studied the role of virtual world design for supply chain education,

Rahimian et al. [8] developed an immersive game-like virtual real-ity interface for Architecture-Engineering-Construction (AEC) professionals education,

Ali et al. [9] devised an interactive virtual chemistry laboratory for simulation of high school experiments,

Griol et al. [10] proposed an approach to develop intelligent learning environments by means of immersive virtual worlds

- In this paper, we discuss the important facts about the teaching strategies in VR.

These case study plans include:

- (1) VR classroom activities
- (2) a full VR lesson design
- (3) a multi-cultural project.
- In the end, we illustrate the diagnostic assessments for differentiation of students in a VR class.

CASE STUDY PLAN I: VR CLASSROOM ACTIVITIES

- *A. Activity1: Present Topic "Me and My Family" in VR.*
- **Before the VR Class.** The teacher will send the instructions' video and the Quizlet link to the teams 3 days in advance. The students will learn the new words by themselves using Quizlet. The students will make a presentation about the topic before the lesson and present it in the virtual class. After the students finish their presentation, they will hand it in, and the teacher will let them know if they need to add something to reach the presentation standards.

CASE STUDY PLAN I: VR CLASSROOM ACTIVITIES

- *A. Activity1: Present Topic "Me and My Family" in VR.*
- **During the VR Class.** The students will present the topic in the VR classroom, including basic information about family members, their jobs and their own dream school, dream job, what are the advantages and disadvantages of choosing their dream school, why they choose a particular career, and so on. The students can choose VR video or VR slides, or VR 3D animation for this presentation. After that, the students will be asked to review their own presentation and their peers' presentation, writing feedback on the presentation through VR interactions.

CASE STUDY PLAN I: VR CLASSROOM ACTIVITIES

B. Activity2: Learning new Vocabulary and Sentences in VR.

Through help with VR applications, teachers may give the students more supportive and specific comments on their work through VR interactions. Teachers can comment on the students work and give them positive feedback, but that may not be specific enough in traditional classroom.

CASE STUDY PLAN I: VR CLASSROOM ACTIVITIES

B. Activity2: Learning new Vocabulary and Sentences in VR.

Rather, in a VR classroom, teachers can give more specific feedback to the students and make the students feel they really did a great job on the presentation through VR gifts. Secondly, VR apps can remind teachers to ask students' opinions regarding previous presenters. In addition, VR apps can make the students interact more with each other, not only present by themselves. They can also discuss some points with their classmates through VR chat boards. Below is the detailed plan.

CASE STUDY PLAN II: A FULL VR LESSON DESIGN

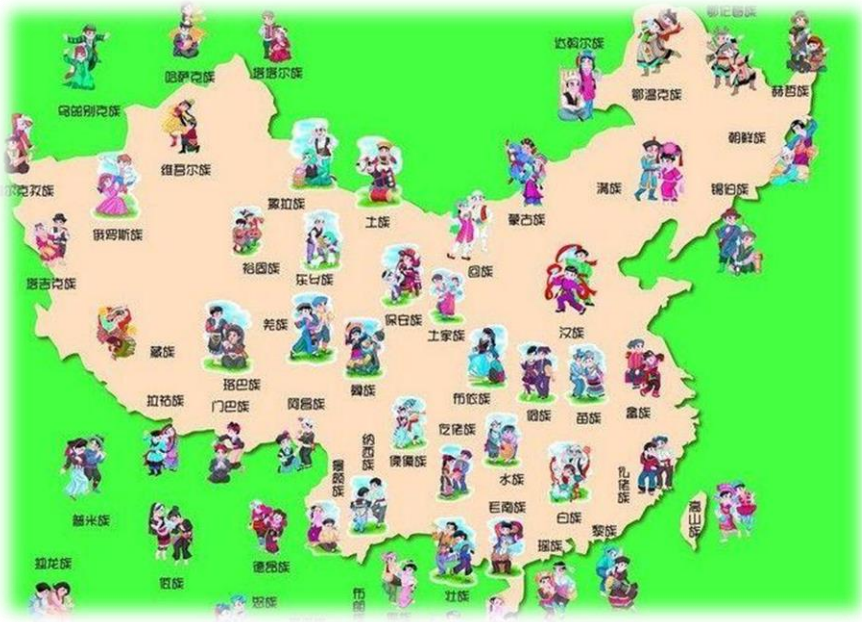
The target amount of time for the full lesson is 40 minutes. During the VR class, first, let the students use Pin Yin to read simple texts independently. Then, let the students write in VR by dictating the Chinese characters to be learned under the Four Skills Requirement (listening, speaking, reading, and writing). After that, let the students understand basic, simple language materials closely related to their personal lives and everyday situations.

CASE STUDY PLAN II: A FULL VR LESSON DESIGN

- At the end, let students continue to develop good habits in listening and speaking. Students will be able to present the topic ”Me and My family” in Chinese. Students will be able to connect the prior knowledge (such as my family, hobbies, etc.) to the new knowledge (such as career, occupations, etc.). Students will be able to talk about their dream school and dream job in a critical way.

CASE STUDY PLAN III: A MULTI-CULTURAL PROJECT

- Here, we give an example of a VR class project proposal called Minorities in China. The China Studies program includes multi-cultural projects about the ancient town of Lijiang and Naxi culture in China, in which students will learn about China's ethnic cultures and special cultural practices.



IARIA

CASE STUDY PLAN III: A MULTI-CULTURAL PROJECT

- The idea of this project was born for the students to understand the culture and cultural differences of China and other parts of the world through the Google Earth VR app, and by consulting materials and personal experience and making a culture introduction VR PPT about a certain place on Google Earth through virtual tours.

DIAGNOSTIC ASSESSMENTS FOR DIFFERENTIATION

- The data collected from the pre-assessments in VR education can help the teacher easily have a general idea about the students' learning stages. It is important to know the students in-depth as well. It can also guide the formative assessment or the summative assessment later in the learning process. Teachers can target the students' weaknesses to give instructions and assessments for the students through personalized VR classes. It is important for grouping as well. Either for homogeneous or heterogeneous grouping methods, the teachers need to know the differences between the students in advance. Teachers can give specific support with the data collected from the students. This is similar to a doctor helping the patient according to the diagnostic results. For teachers themselves, it can also be helpful. Teachers can use the data to make teaching plans and learning objectives instead of wasting time teaching subjects all the students already learned or understand.

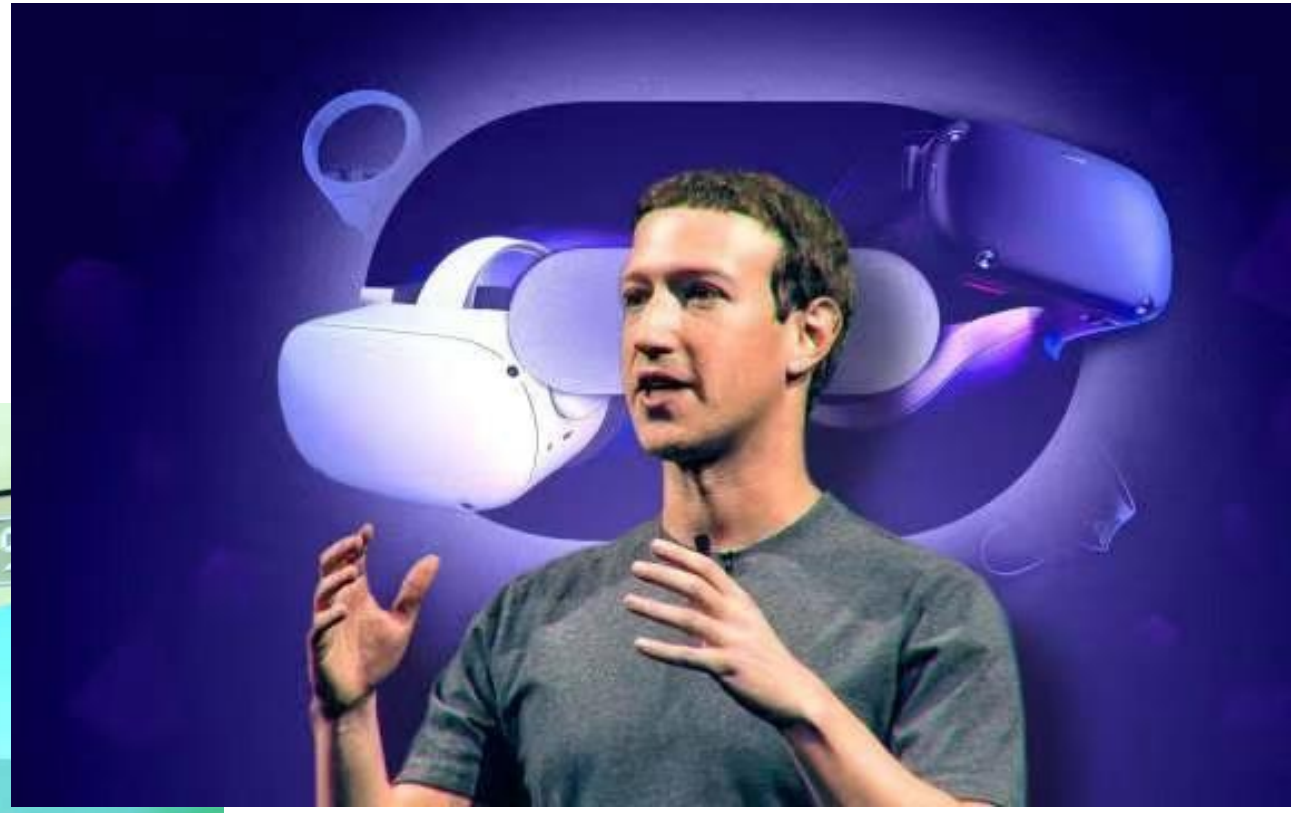
Impact on Students

- In a VR classroom, the students can be both interested and challenged. They will listen more carefully and pay more attention to what they are doing because the teaching content can be both interesting and challenging for most of the students due to the powerful algorithms employed in VR applications.

Impact on Students

- The students will get a chance to improve themselves by focusing on whatever they need according to the pre- assessment. The students will enjoy group work more because teachers can form the groups according to the pre-assessment results and the VR is user-friendly for easy interactions. The grouping method will make all of the students feel comfortable and safe, which can improve the working efficiency at the same time.

Metaverse



Bibliography

[1] M. Roussou, “Learning by doing and learning through play: an exploration of interactivity in virtual environments for children,” Computers in Entertainment (CIE), vol. 2, no. 1, pp. 10–10, 2004.

[2] Y.-C. Huang and S. R. Han, “An immersive virtual reality museum via second life,” in International Conference on Human-Computer Interaction. Springer, 2014, pp. 579–584.

[3] P. J. Standen and D. J. Brown, “Virtual reality in the rehabilitation of people with intellectual disabilities,” Cyberpsychology & behavior, vol. 8, no. 3, pp. 272–282, 2005.

[4] S. Matsentidou and C. Poullis, “Immersive visualizations in a vr cave environment for the training and enhancement of social skills for children with autism,” in 2014 International Conference on Computer Vision Theory and Applications (VISAPP), vol. 3. IEEE, 2014, pp.

230–236.

[5] R. D. Webster, “Corrosion prevention and control training in an immersive virtual learning environment,” in CORROSION 2014. OnePetro, 2014.

Bibliography (cont.)

[6] B. Chang, L. Sheldon, M. Si, and A. Hand, “Foreign language learning in immersive virtual environments,” in The Engineering Reality of Virtual Reality 2012, vol. 8289. International Society for Optics and Photonics, 2012, p. 828902.

[7] T. Bastiaens, L. Wood, and T. Reiners, “New landscapes and new eyes: The role of virtual world design for supply chain education,” Ubiquitous Learning, vol. 6, no. 1, pp. 37–49, 2014.

[8] F. P. Rahimian, T. Arciszewski, and J. S. Goulding, “Successful education for aec professionals: case study of applying immersive game-like virtual reality interfaces,” Visualization in Engineering, vol. 2, no. 1, pp. 1–12, 2014.

[9] N. Ali, S. Ullah, A. Alam, and J. Rafique, “3d interactive virtual chemistry laboratory for simulation of high school experiments,” Proceedings of EURASIA GRAPHICS, pp. 1–6, 2014.

[10] D. Griol, J. M. Molina, and Z. Callejas, “An approach to develop intelligent learning environments by means of immersive virtual worlds,” Journal of Ambient Intelligence and Smart Environments, vol. 6, no. 2, pp. 237–255, 2014