

Math course on World Wide Education Platform

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**Introduction**

World Wide Education platform is a self-paced online learning platform with multiple learning and teaching modules, such as learn through play modules, self test parts, collaboration room, and personal blog pages. This platform is currently designed for K-12 students who need more practice and knowledge with their regular school learning. The whole platform is designed as a learning community that students can build their own learning structure and learning plan. The courses on this platform are offered and designed by World Wide Education Company that I am in charge of this company for its instructional design and course development. This company uses online pedagogy to conduct the courses so that the students can understand and learn easier and more effective. The online platform requires more student-centered rather than teacher-centered instructional design approach. So this is a dramatic change for teachers who will teach on this platform. As a developer, I also felt the differences between the online platform course and traditional class course. This article will use math course for grade one students as an example to illustrate how technology and online pedagogy make the course more effective. The four fundamental rules are the basis of math content teaching. In Chinese math teaching area, the mutually-inverse operation is critical to teacher to make students understand the relationships between the numbers. And in Chinese math teaching, the equation concept and unknown number is taught through the whole progress of primary school teaching. So the core content of grade one math is to let students understand the interrelationship of the numbers and have basic concept of four operations.

## **Literature Review**

Technological Pedagogical Content Knowledge (TPCK) is a framework that identifies the knowledge teachers need to teach effectively with technology (Oliver, 2011). Ageli and Valanides asserted that TPCK is a unique knowledge body that transformed from the existing knowledge contents. And it can be cultivated and evaluated (Angeli & Valanides, 2009). In the recent research direction, there are at least three approaches in TPCK research: from pedagogy aspect, to research the interaction of technology and knowledge content; from knowledge content aspect, and to research how technology and pedagogy work effectively develop the understanding of students of the core knowledge content; it also can stand on technology view and research the interaction of teaching goal and knowledge content (Bull et al., 2007). In this research, I will use TPCK to research how World Wide Education platform work with online pedagogy and make the math content more accessible for grade one students.

On World Wide Education platform, the technology offers teacher a more visual and direct teaching platform to illustrate the relationship of the numbers. Recently, many researches outcomes asserted the new technology can enhance the quality of teaching of math. For example, the case-study research from Nilsson and Pareto demonstrated that game promotes an unconventional approach supporting students having math difficulties, through visual representations, learn-by-exploration and learn-by-teaching models (Nilsson & Pareto, 2010). The video and game of teaching offered on the platform can make students learn abstract concept much easier and more effective. Not only the technology, but also the effective pedagogy for online teaching is crucial for math teaching on the platform. Based on the platform feature, the interaction and student-centered teaching approach should be emphasized during the teaching

process. Some researches have demonstrated that the sense of community among students such as group discussion, collaborative group projects, and other forms of interaction can promote the learning results (Shackelford & Maxwell, 2012). World Wide Education develop various forms of interaction for students, so that they can exchange their thoughts during their math learning, and problem based discussion can help students to get many ideas and creative solutions in math course. Especially, for grade one students, the belongings and enrollment is key factor for students to find self-confidence in learning. Student-centered learning environment also offered a easy controlled learning method for students. However, grade one students are adapting new environment, they need more guide from teachers than higher grade students. Hence, students as an important role in the study and teacher offers necessary guide and monitor to students such mutual relationship of teacher and student is more suitable for online course (Elen, Clarebout, Léonard, & Lowyck, 2007). Therefore, the integration of math content, interactive online technology and student-centered teaching method is essential topic for researching and can provide a deep influence of the development of World Wide Education Platform.

### **Research Questions**

1. Teaching effectiveness of teacher perception with TPCK research: Whether teaching math course with World Wide Education platform make teaching easier or more challenge?
2. Learning effectiveness of students performance with TPCK research: Compare the outcome of traditional math course and WWE math course.

### **Research Design**

For research question 1, we use 5-Likert survey from strongly disagree to strongly agree to conduct the teaching experience of teachers who are teaching math course on World Wide platform (Table 1). The content of the survey may contain technology related items, teaching method related items, and also open answer questions relate to teacher's personal feelings of online teaching. For the technology related items, the difficulty level of user-interface, course proceeding, and interaction activities will be main factors to exam the effectiveness of teaching. For teaching method items, the content modification, game based video utilization and self-paced monitoring will be important aspects for this survey.

**Table 1**

|                                                                              | Strongly<br>Agree | Agree | Not<br>Sure | Disagree | Strongly<br>Disagree |
|------------------------------------------------------------------------------|-------------------|-------|-------------|----------|----------------------|
| 1. The interface of teaching modules is easy to learn and use.               |                   |       |             |          |                      |
| 2. When upload any materials you can find the right place with no difficult. |                   |       |             |          |                      |
| 3. Digital teaching is better than traditional textbook and blackboard       |                   |       |             |          |                      |
| 4. Learn through play can get students' attention easier.                    |                   |       |             |          |                      |
| 5. Students have longer interesting in math than traditional class.          |                   |       |             |          |                      |
| 6. Students discussion may encourage more engagement in the class            |                   |       |             |          |                      |
| 7. Students' homework occur less mistake after their discussion              |                   |       |             |          |                      |
| 8. Feel more confidence in teaching when                                     |                   |       |             |          |                      |

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**conduct online learning****Open Answer:****9. Your opinion of math course on WWE?****10. What is the most challenge for you to****conduct math course on WWE?**

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For the research question 2, to compare class performance between the traditional and WWE platform conditions, grades of students in different types of class taught by the same teacher will be compared. This is a fair comparison because the courses should be identical except with respect to traditional vs. WWE. Grades in the traditional classes will be provided from the teacher, while grades in the WWE math classes will be harvested from the WWE learning platform.

At each class, for the experimental term, the mean number of points in the traditional class will be compared to the mean number of points in the WWE class using Student's t-test at the level of  $\alpha = 0.05$ . If the WWE mean is statistically significantly lower than the traditional mean, the WWE course will be considered inferior, and work will need to be done to improve it. If the WWE mean is statistically significantly higher than the traditional class mean, further analysis will be done to try to assess TPCK improve the WWE class appears superior. If the WWE mean is not statistically significantly different than the traditional mean, student performance in the courses will be considered comparable.

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