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Interactive Scenario-based Learning Experience

Customized Interactive White Board and Learning Package to Motivate Student Learning

September 2019

INTERACTIVE SCENARIO-BASED LEARNING EXPERIENCE

BACKGROUND CONTEXT

Many vocational and technical students are more drawn towards hands-on practical tasks rather than theoretical lessons. The use of conventional frontal teaching methods is insufficient to motivate or engage them. According to Moore (1989), fostering student interaction with content, peers and instructors via a purposeful design of interactive components into the instruction could help to create a motivating environment for more effective learning.

In 2015, a 6-strong project team from School of Electronics and Info-Comm Technology (SEIT) in ITE College West helped to design and develop a pedagogical solution to foster student interaction with their lecturers. Their method was three-pronged:

- To motivate students to learn and thus improve the retention of learning
- To engage students towards learning the technical networking-related modules
- To enhance social interaction among students from learning in groups

In addition to frontal teaching, the 'Interactive Scenario-based Learning Experience' involves the use of interactive whiteboard with a customized table to enable students to interact with content and peers in two operation modes; Participatory Mode (PM) and Facilitation Mode (FM).

The accompanying learning packages are based on modules offered in SEIT, containing

Overview

Implementing Institution(s):	Institute of Technical Education (ITE), Singapore
Region(s) of Implementation:	ITE College West, School of Electronics & Info-Communication Technology (SEIT)
Timeline:	July 2016 - ongoing
Beneficiaries:	Students enrolled in Nitec in Infocomm Technology Course **Previously offered as Nitec in Info-Communications Technology (Mobile Networks & Applications, Cloud Computing, Networking and Systems Administration)*
Total cost incurred/resources required:	Equipment and software (SGD 63,200.62). Instructional material design, development, and testing (500-man-hours) Internal evaluation (42-man-hours) Total: SGD 63,200.62 + 542-man-hours *(Note: Funding from ITE)*

scenario-based activities designed to allow learners to fully immerse in the real-world problems and tasks. Students attempt the interactive learning activities (eg: drag and drop, jigsaw puzzles and multiple choice questions) in groups while discussing and reflecting through visual representations using the interactive whiteboard.

IMPLEMENTATION OF THE PRACTICE

During the early planning stages, the project team embarked on a feasibility study, gathering inputs from the teaching staff and also meeting with project sponsors and school management. Once funding was approved, the project kicked off with detailed roles and responsibilities of project manager and team members. Hardware and software installation were then carried out, followed by in-house learning package content development and evaluation for modules (eg: Server Essentials, Network Essentials, IT Essentials).

Each module contains two to three lesson packages, where each lesson package will take about 45 to 60 minutes of learning. A complete implementation for a topic takes approximately 65 minutes in a classroom environment.

Before going through an interactive lesson package, pre-quizzes are conducted by lecturers for 10 minutes. Using activities in the interactive lesson packages, students explore and discuss in groups (4 to 5 students per group) for approximately 45 minutes. During this period, lecturers will facilitate student learning. After going through the lesson package, post-quiz is conducted by lecturers for 10 minutes.

Fig. 1 Classroom Implementation of Interactive Scenario-based Learning

Merrill's (2002) principles of learning (Fig. 2) form the basis of the interactive activities developed in the lesson packages. Students will activate their previous knowledge through pre-quiz activity, demonstrate their understanding by interacting with activities, apply their knowledge to solve the tasks before finally integrating ideas and consolidating their understanding via a post-quiz.

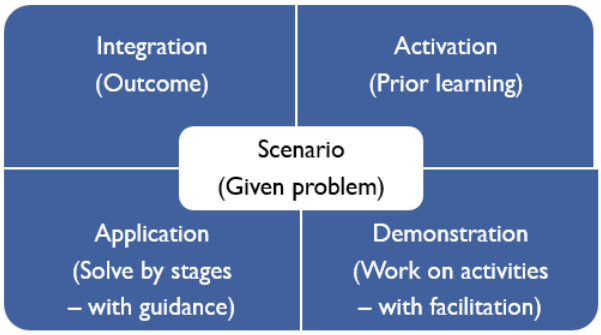

Fig. 2 Development of Lesson Package

Every learning package comprise of lesson objectives, learning scenarios (Fig. 3) and interactive activities. Each provide Facilitation Mode (FM) learning for groups of students to participate in student-centred group activities facilitated by lecturers; and Participatory Mode (PM) learning where students use mobile devices to scan QR codes and participate in whole-class interactive quizzes (Fig. 4).

The interactive whiteboard is used for both

frontal teaching and student-centred learning. For frontal teaching, lecturers can write on the interactive whiteboard; for student-centred learning, students can gather around the interactive whiteboards in groups to work together.

The lesson package is completed with evaluation where the interactive whiteboard SMART Response Software analyses the students' answers and provides lecturers with immediate feedback of students' performances. Lecturers may review the scores generated and either show the learning analysis (in graph form) to the whole class or discuss selected student's performances in private. The performance could also be used to plan following remedial or enrichment lessons.

> *"You assume the role of an IT Consultant for XYZ Pte. Ltd. You are tasked to look into printers that should be allocated for the various departments in the company"*

Fig. 3 Example of Learning Scenario

IMPACT OF IMPLEMENTATION

An internal evaluation was carried out by the project team using Kirkpatrick's evaluation (1996). The students perceived the interactive activities to be useful where the approach reinforced understanding of the topic, encouraged application of theory, created enjoyment through discussion and group learning, anticipation for further interactive activities with peers.

On the other hand, the students seem to be more self-motivated and self-regulated with improved learning retention after attempting the quizzes in the learning packages. They were eager to test themselves with the quizzes after completing the interactive learning activities.

Students were also more motivated due to the interactive nature of the quizzes in the learning packages, which was an en masse interactive activity, compared to the previous individualized quizzes implemented via the learning management system.

The scenario-based tasks enabled the students to apply theories and concepts in work-based role engagement. Thus, the students learnt meaningfully as they interacted with authentic tasks, encountered true-to-life challenges while developing and practicing real life skills they will need to operate successfully in the future.

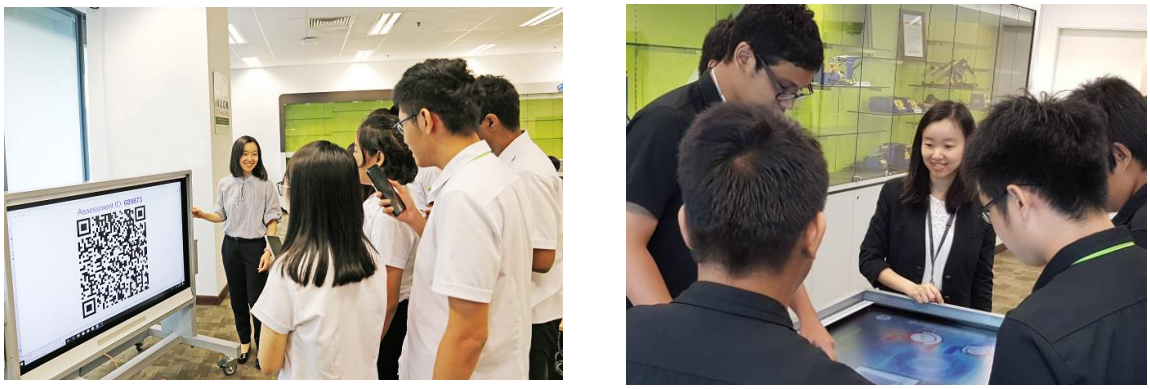

Fig. 4: Using the Interactive Whiteboard for PM and FM Learning

LESSONS LEARNT AND FUTURE OUTLOOK

As with other student-centred teaching and learning approaches, effective facilitation skills are required in this innovative pedagogy. Lecturers need to observe the interactions among students and intervene if necessary, for example guiding students to discuss, encouraging students to contribute in the group, guiding students to recall prior learning and apply learning. Lecturers are facilitators of interaction, communication and collaboration.

Whenever there are new lecturers teaching the modules, familiarisation and workshop for lecturers need to be conducted systematically so that they are acquainted and well-versed with the system and be able to facilitate students' learning. For this implementation, all lecturers teaching the modules involved have been trained through a few sessions of hands-on workshops by the project team, where they experience the learning packages as learners.

The 'Interactive Scenario-based Learning Experience' has been acknowledged as an innovative practice within the institution in Year 2017. The support and resources from institution's funding for the interactive whiteboard and software is important to encourage more ground-up initiative such as this, which was led by a team of six academic staff, who managed the project, designed and developed the programme and interactive learning packages.

The in-house content development for the interactive whiteboard learning packages has built the capacity of lecturers. This culture of encouraging innovative teaching practices among staff should be continued. As the system is PC-based, it could be used to further explore different strategies in using widely available free ICT tools such as mind mapping tools (XMind, bubbl.us), brainstorming boards or sticky notes (Padlet, Lino), block programming (Scratch, AppInventor) etc.

CONCLUSION

The transmission of technical facts and knowledge are building blocks for good practical hands-on sessions. The 'Interactive Scenario-based Learning Experience' could be a model for TVET classroom practitioners on balancing teacher-centred didactics and student-centred interactivity to enliven theory classes; so students' attention is gained, enabling them to engage with the learning self-directedly, with peers and with the facilitation of lecturers.

The learning packages that were designed to present scenario-based problems for learning activation, demonstration, application and integration presents a novel way of using interactive whiteboard technology with sound pedagogical materials and methods to foster a student engaging learning environment for 21st century students. In this system, students interact with solving authentic scenario tasks via technology and with peers. Students are facilitated to expand their knowledge base and develop communication skills in a meaningful context for application in the real world, which could facilitate the future work skills.

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FURTHER INFORMATION

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