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Transformation of Challenge-based Learning Spaces in Higher Education

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Abstract

Challenges in learning enable students' engagement with lifelong learning through the implementation of new technologies and skills development. Students' nowadays are obliged to be equipped with various different skills; therefore, integrating a challenge-based learning space can create a competitive attitude as well as enhancing teamwork and effective communication among students. Learning in a challenge-based space can inspire students to pursue their careers in specific fields by applying the theory to real-world problems and helping communities to solve complex social problems. However, poorly designed learning spaces can lead to disruptions in learning. The development of learning spaces comprising three important aspects of pedagogy, technology and space. This will be one of the important roles in producing meaningful learning. Challenge-based learning does not only include virtual learning space as it also supports an active learning process whereby the students can relate it to real-world problems. Taking into account the Space for Knowledge Generation (SKG) Principles in the development of the learning space, the learning spaces could fulfill the needs and supports the learning of the students towards the 21st century. Therefore, this study discusses issues and challenges in developing a challenge-based learning space, which focuses on three important aspects: pedagogy, technology and space.

Keywords: Challenge-Based Learning, Learning Spaces, Active Learning, Design And Development.

Introduction

Previous studies have noted that challenge-based learning has the potential to connect learning in a globalised context (Baillie et al., 2014; University of Western Australia, 2014; Hussman et al., 2010; Technical University of Denmark, 2014). This pedagogy is particularly useful in 21st century education because students can develop their skills by embarking real projects in an area or working with a governmental or non-governmental organisation. In addition, challenge-based learning can also be formal or informal. Challenge-based learning activities certainly benefit the students through the implementation of project-based

learning, as they engage students in real-world problems and enable them to be responsible to provide solutions (Gaskins et al., 2015). However, traditional learning spaces let the lecturers to speak more frequently as the students are given the chance to produce their ideas. Therefore, learning could occur at the highest level so that they are viewed as project-based learning (Ismail & Mohamad, 2017). The limitations of students' ability to solve problems in the real world are also considered as a source of skills and expertise which most of the students are still lacking. This is because the Z-generation has a heavy reliance of the use of technology in searching for information as well as learning. Their learning space is not only useful for the virtual world but also for the physical learning space.

Unresolved problems are likely to produce students with lower comprehension in learning and unable to think critically, making them an inexperienced learner in solving problems involving skills. This is summarized by Brown and Long's (2006) study which whereby the 'trends' of the design of the learning space showing that there are three main 'trends' in the design of the learning space namely i) social and active learning strategies, ii) human-centred (human) centred learning, and iii) tools that enhance learning. In the study by Jamieson et al (2000), he proposes 7 principles of classroom design that are: i) repetition of usage ii) optimisation of usage in each space iii) facilities convenience iv) integration of campus functions v) controls of features and functions for teacher and student vi) well-suited of different curriculum activities and, vii) easy-of-use for students to access and use in the environment. As such, it is imperative to transform the challenge-based learning space in the university to make learning smoother and meaningful (Norman et al., 2011; Gaskins et al., 2015)

Conceptual Framework of Challenge-Based Learning Spaces Development in Higher Education Institution

In implementing the concept of the challenge-based learning approach in higher education, this approach can be integrated with design and development approach (Richey et al., 2004) and the ADDIE model (*analyze, design, development, implementation, evaluation*), as summarized in Figure 1.1. and Figure 1.2. Based on the conceptual framework in Figure 1.1, the development of optimal challenge-based learning spaces requires pedagogy, space and technology to enhance, use and support one another. The following diagram illustrates how pedagogy, space and technology could work together in a classroom. The key questions for developing a learning space are framed in each of these three areas. This conceptual framework is suitable for all institutions in assessing the impact of their learning spaces in these three areas.

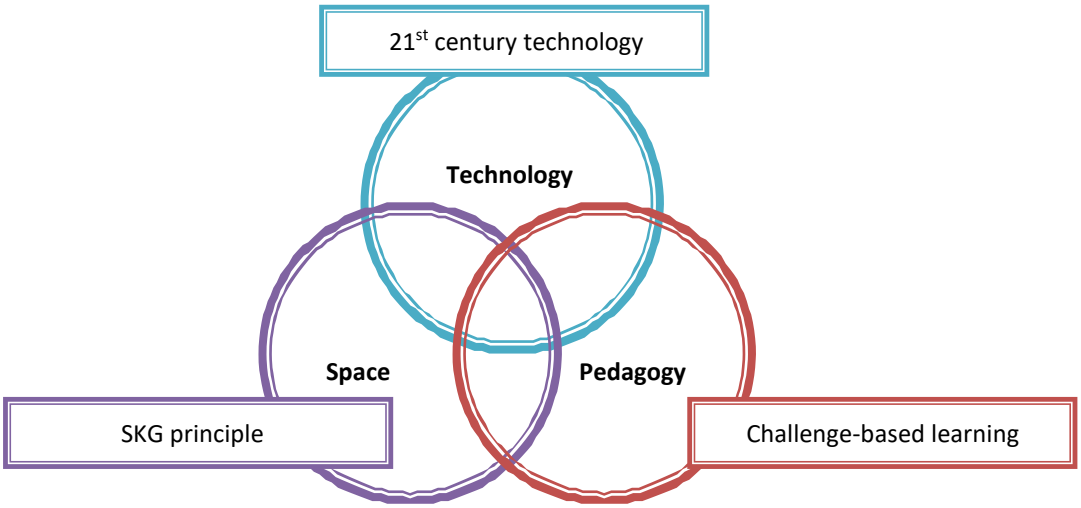

Figure 1.1: Conceptual Framework of 21st Century Challenge-Based Learning Spaces for Higher Insitution
(Adapted from Radcliffe, 2009 as cited in Wilson, G dan Randall, M., 2011)

For the first phase (the analysis phase), the needs of students in the learning space are assessed (or *needs analysis*) to identify the problems that students face in challenge-based learning spaces. In the second phase, the design phase, the learning space is designed based on the principles of SKG where the space is specifically designed for students in tertiary institutions. In the next phase (development phase), challenge-based learning spaces are developed and implemented in the implementation phase using learning spaces designed specifically on SKG principles. In the last phase (assessment phase), pedagogical, space and technology relationships are evaluated by students. The solution to this learning space will be linked to challenge-based learning where the real issues in the community can be solved and it will make learning more meaningful and enhance the students' ability to contribute to society.

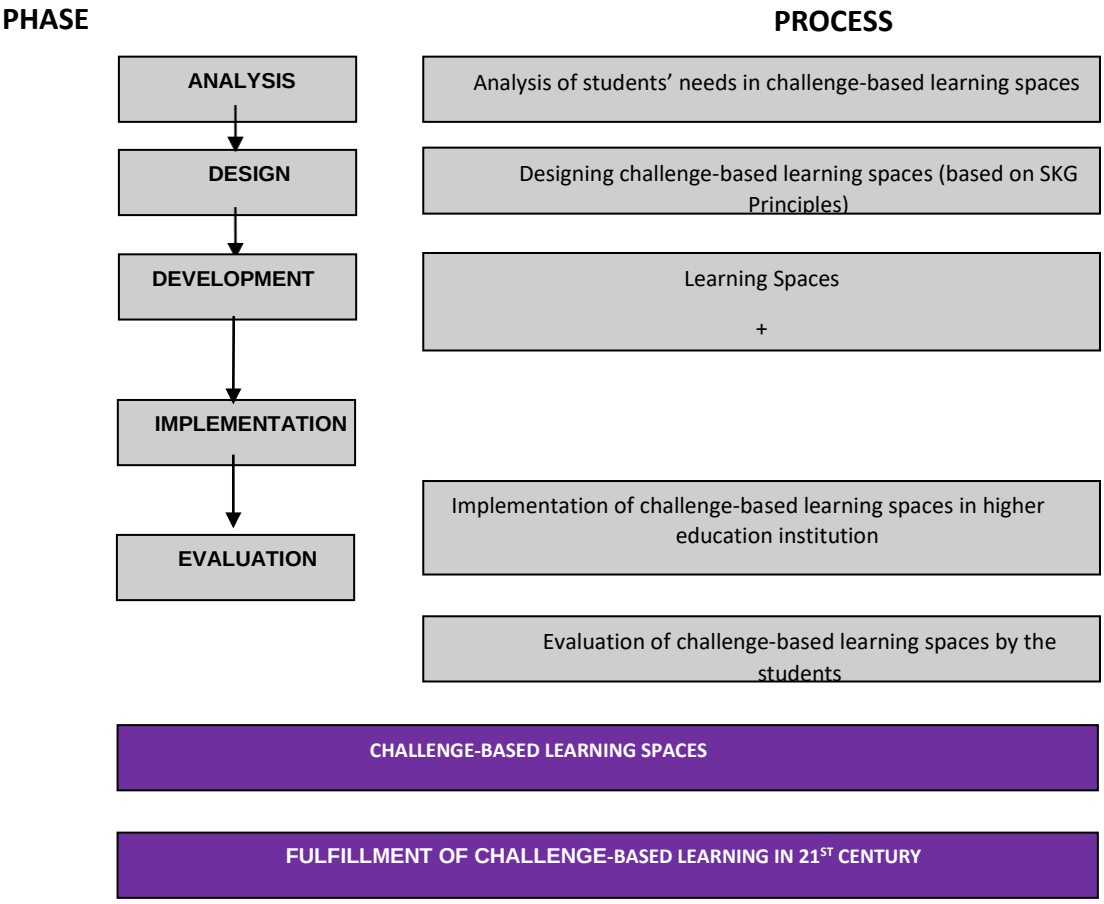

Figure 1.2: *Development of challenge-based learning spaces for higher education institution*

Recommendations for Challenge-Based Learning Facilities Development in High Education Institution

As stated in Figure 1.3, the existing space shows the original arrangement of the furniture in the front area of the space. The analysis of student needs in the learning space is taken into account in developing a learning space that is in line with the pedagogical and technology tools implemented.

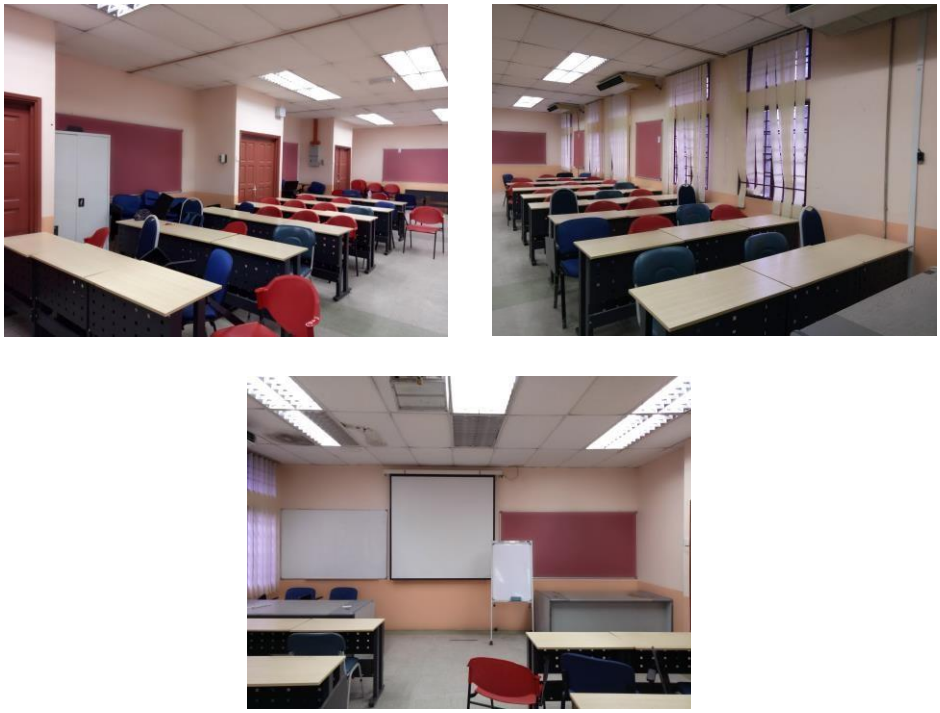

Figure 1.3: *Learning Spaces (Before)*

Figure 1.4: *Principles of SKG*

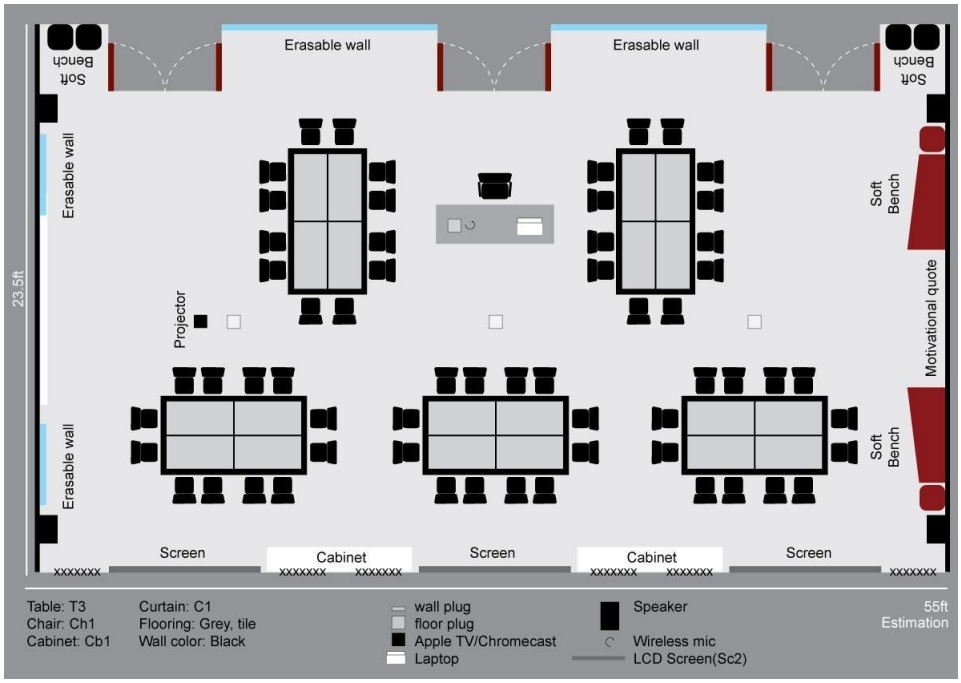

Figure 1.5: Challenge-Based Learning Spaces Development Plan

SKG principles consist of as comfort, aesthetics, flow, equity, blending, affordances and repurposing. The design of the challenge-based learning spaces development plan , as shown in Figure 1.5, involves more consideration on the primary focal point of the space. In the traditional configuration previously used in Figure 1.3, it is noted that the front row of chairs and tables stand fixed. A transmitter is also focusing right on the front wall. In the development of challenge-based learning spaces plan, these spaces are designed to reduce focus in one direction, allowing group teaching and assignments to be supported throughout the space. This aspect is important to ensure the ability of the space to be more flexible in supporting challenge-based learning. It adheres to one of SKG's principles; repurposing, which can be customised according to different purposes.

Comfort and aesthetics are two of the most important principles for a challenge-based learning spaces development project. The configurations that existed in the previous space are uncomfortable for many students. The use of fixed chairs in a row of desks without a centre point, the students are unable to move freely in the room and the students in the back could not visualise the transmitter screen comfortably. Listening clearly in this space is very challenging and the lecturers must use higher voice projection for a long period of learning. Uninteresting learning spaces resulted ineffective pedagogy. As suggested in Figure 1.5, the redesigned space can be considered more attractive in colour around the minimalist space. The use of TV screen, speakers and microphone allow the students to see and hear more clearly and they are free to move around in groups as the chairs and tables used can be restructured.

The flow principle is one of SKG's design principles that propose a space that enable a more meaningful knowledge transfer to future generations. In addition, the development of challenge-based learning spaces takes into account the reusability of furniture so that it would not interrupt the learning flow. Challenge-based learning spaces are designed to support students in subjects that require a collaborative approach and group work. In this

way, the challenge-based learning space can be designed based on the principles recommended by Jamieson et. al.,(2000).

The learning space is covered with tiles making it easier for students to move from one place to another. Collaborative discussions can be conducted more effectively and more comfortable as the space designed is not limited to formal learning. The use of couches creates an informal learning environment whereby the students are given the opportunity to generate ideas and thoughts to the wall that can be easily refined during group discussion.

Conclusion

Challenge-based learning transformations in tertiary institutions are crucial as a learning style that enhances students' skills by maintaining more conducive use of physical space and virtual space in problem solving. Indirectly, challenge-based learning in a specially designed learning space enables students to share skills and expertise in a real-life community. The redesigned learning space does not seem to interfere with the student's learning process as it is very helpful in solving students' real-life problems.

In the 21st-century education system, demonstrating the use of pedagogy, space and technology, has the potential to change students' interest in learning, giving them the opportunity to use the skills they have in helping to solve community problems and become more resilient and competitive. Thus, higher education in Malaysia can produce students with high resilience and critical thinking to better prepare themselves for future employment.

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