

Maker-Centered Multidisciplinary Learning – Preparing Future Ready Learners in Singapore Schools for Learning to Learn

Teo Beng Chong and Koh Hon Jia

KEY IMPLICATIONS

- The multidisciplinary curriculum modules implemented by the teachers in this project could be adapted by other teachers and used in their respective modules.
- To allow for better implementation of such an approach, curriculum structure change, such as allowing fewer subjects taken by students in the formal curriculum or creating white space for teachers and students, is beneficial.
- For the lower secondary students, assessments can be tweaked to include more opportunities for discovery and collaboration rather than formal pen-and-paper assessments.

BACKGROUND

The introduction of multidisciplinary teaching and learning paradigms into formal education remains a huge challenge with high risk because of the traditional high-stake examinations. However, the integration with maker-centered learning approach have opened new opportunities and created affordances for greater adoption of multidisciplinary teaching and learning in formal education. The question at hand is no longer about what and why but when.

FOCUS OF STUDY

The benefits of a multidisciplinary approach have been well documented, such as the uncovering of preconception or recognizing bias, advancing critical thinking, and helping students develop their cognitive abilities, just to name a few. However, the understanding of maker-centered multidisciplinary approach in pre-tertiary education is still lacking. There is a need to study the affordances and implications of maker-centered multidisciplinary approach implementation into the formal education system. Thus, the project aims to design, create, enact, and study the implementation of a multidisciplinary curriculum with supporting learning space and time in our school system.

KEY FINDINGS

The maker-centered multidisciplinary approach allows the teacher to better connect with the students and to invoke the students' knowledge of other subjects to explain a concept or learning principle. It also allows the teacher to draw content knowledge from the students' core curriculum and then help them to see the relevance of this content in the real world. It gives the students a wider context to understand the importance of learning (e.g., science),

beyond the common application examples they have seen in the formal (subject-based) curriculum. It improves engagement and heightens the students' interest and curiosity when they observe how even the most fundamentals of science that they have learnt in school can be readily applied in the real world to solve problems. It provides the students with a platform to experience applications of core content knowledge in an informal curricular setting where there are no stakes and no assessments.

The fundamental curriculum structure in mainstream schools in Singapore is subject-based and most students at secondary school normally must take several subject modules. This presents a challenge to students if they take on an additional module on top of the existing ones. This also presents a challenge to teachers if they need to teach an additional module on top of their existing ones. Furthermore, teachers might not be readily trained to teach a multidisciplinary curriculum. A pre-tertiary school would normally require additional resources, manpower and curriculum time in implementing a multidisciplinary curriculum.

SIGNIFICANCE OF FINDINGS

Implications for practice

The multidisciplinary curriculum modules implemented by the teachers in this project could be adapted by other teachers and used in their respective modules. However, there might be a need to train the teachers.

Implications for policy and research

To allow for better implementation of such an approach, curriculum structure change, such as allowing fewer subjects taken by students in the formal curriculum or creating white space for teachers and students, is beneficial.

Learning gains (for studies involving intervention)

Assessments can be tweaked to include more opportunities for discovery and collaboration rather than formal pen-and-paper assessments.

PARTICIPANTS

The total sample size for this project includes 49 students and five teachers from one secondary school.

RESEARCH DESIGN

The project's design is aimed toward developing a greater understanding of the design and implementation of maker-centered multidisciplinary approach and its efficacies in Singapore pre-tertiary school. The methodology adopted is based primarily on a qualitative case study. The instrument used include lesson observation, focus-group discussion, and survey. The curriculum consists of a 7-week module of a 2.5-hour lesson involving students from different levels and classes, with parts of the content related to the different disciplines.

About the authors

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