

# Investigation of Making-centred Learning Spaces in Singapore Schools to Promote Students' Interests in Science and Technology

Wu Longkai and He Sujin

## KEY IMPLICATIONS

- In building the teachers' buy-in to a more making-centred pedagogical enactment, there should be sufficient training designed to support teachers in effectively implementing such a change. Teachers who have never experienced these making-centred practices in their own education will have difficulty implementing them in their classrooms.
- With "no-assessment" criteria, teachers in making-centred learning programmes are playing a mentoring role, which witnesses the blending of traditional knowledge-informing approach and an interest-fostering approach.
- Each school possesses its uniqueness in the development of making-centred learning programmes, jointly defined by its historical trajectories and contextual conditions.

## BACKGROUND

In support for the need of an innovative 21st century learning environment in schools, we turned to the emergence of the maker movement in education as a strategic approach for the global knowledge-based society. The approach

of making in learning is still relatively new, but emerging research has documented how making environments support learners through the processes of investigation and invention and, in doing so, develop students as producers rather than consumers of knowledge and technology.

## FOCUS OF STUDY

In this exploratory study, we describe how learning has occurred in making-centred learning environments, provide observations made in these spaces and investigate the experiences of the students while they interacted within these learning spaces. Our intention is to develop new insights into the design of learning environments that are based on the direct experiences of students, and to contribute to dialogues about blending making-centred spaces into the curriculum that are relevant to Singapore schools.

## KEY FINDINGS

- Schools' developmental trajectories in defining the building of making-centred learning spaces

- Four learning dynamics were identified in relation to shaping students' identities and pro-STEM (Science, Technology, Engineering, and Mathematics) attitudes in making-centred learning spaces: (a) application of knowledge, (b) freedom in exploring, (c) exposure to new opportunities, and (d) identity
- Four contextual conditions were identified in relation relating to enabling the building of making-centred learning spaces in the school setting: (a) teacher training and development (b) leadership visionary and belief (c) schools' conceptualisation in making-centred learning (d) disabling constraints

## SIGNIFICANCE OF FINDINGS

### Implications for Practice

Of crucial importance in making-centred learning in terms of pedagogical approach is a shift away from dispensing ready-made knowledge to an environment that facilitates exploration. It appears that not all teachers are ready for this pedagogical shift. Some teachers adopted a more task-oriented approach and were conservative in giving the students autonomy. With the school leaders' understanding of the importance of such learning spaces, they ensured that the involvement and empowerment of staff was necessary, and where necessary, to provide support for changes to grow from the willing participation of all teachers.

### Implications for Policy and Research

For all three schools, the vision of the school leaders (both present and past) plays a crucial role in the possibilities of establishing and implementing making-centred learning. The central notion that the school leaders shared was that the idea of making-

centred learning was explored to meet the learning needs of students with different learning styles.

### Learning Gains

Learning in such spaces go well beyond traditional classroom teaching, emphasising the role of non-hierarchical participation, in which learning does reside in a single authority (i.e., the teacher). We noticed that some students were learning very quickly and their understanding of the subject matter was more than that of the teacher's.

### Proposed Follow-up Activities

Further studies should be conducted in the area of making-centred learning. More teachers need to participate in professional development, in addition to pedagogy professional development workshops.

## PARTICIPANTS

The three case schools were selected, based on their involvement in making-centred activities or their emphasis on the importance of hands-on learning in their schools. The students who were selected for the study were between 13 and 15 years old.

## RESEARCH DESIGN

The research team utilised a descriptive mixed-method case study approach. A total of 100 students were surveyed on their experiences in the various learning environments. The focus group interviews were audio recorded. Extensive field notes were also taken during the initial classroom observations and during the focus group discussions to ensure that data could be cross-checked with the audio and video recordings.

## About the authors

WU Longkai and HE Sujin are with the National Institute of Education, Singapore.

Contact Longkai at [longkai.wu@nie.edu.sg](mailto:longkai.wu@nie.edu.sg) for more information about the project.

This brief was based on the project DEV 04/14 WLK: Investigation of Making-Centred Learning Spaces in Singapore Schools to Promote Students' Interests in Science and Technology.

## How to cite this publication

Wu, L., & He, S. (2017). *Investigation of Making-centred Learning Spaces in Singapore Schools to Promote Students' Interests in Science and Technology*. (NIE Research Brief Series No. 17-020). Singapore: National Institute of Education.

## Request for more details

Please approach the Office of Education Research, National Institute of Education, Singapore to obtain a copy of the final report.

>> More information about our research centres and publications can be found at: <http://www.nie.edu.sg>