

## Use of Comics in Teaching Mathematics

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### KEY IMPLICATIONS

- The use of comics is a viable approach to engage students during mathematics lessons.
- The context provided by the comics is a way to build students' 21st century skills in addition to teaching them mathematics.
- Our study shows a glimpse into how the use of comics could help students with special needs (e.g., dyslexia).

### BACKGROUND

This study is motivated by the recent trend that comics has become recognized as a media of classroom instruction, and the numerous research studies which have shown positive impact on student learning. Evidence has also shown that many students from Normal (Technical) (NT) stream in Singapore have difficulty and lack the interest in learning mathematics. Building on the PI's initial survey that NT teachers have been exploring non-traditional approach to engage their students (some teachers were already exploring the use of cartoons and comics to entice their students in mathematics classroom) in Toh and Lui (2014), and based on the sound literature on contextualizing mathematics, this project on using comics to teach mathematics was conceptualized. This project represents a concerted effort of collaboration between researchers from the National Institute of Education, Singapore and participating schools in developing and implementing a comics package in teaching mathematics in the NT classroom.

### FOCUS OF STUDY

This project aimed to study the impact of the use of comics package on students' motivation and academic self-concept in mathematics, and their performance in mathematics achievement test.

### KEY FINDINGS

- The students enjoyed the comics package not only because it was "new" to them, but also because they could associate each abstract mathematical concept with a context, which may be hilarious to them (Toh, 2009). This further supports the importance of contextualizing mathematics in helping students learn better.
- The teachers also showed that they were actively tweaking the package to better meet the needs of their students. For example, they innovatively created opportunities to engage their students in role-play and the entire class in asking and answering questions with the fictitious characters in the comics. In addition, some teachers utilized the context of the comics to create more mathematical situations that further enticed their students to perform mathematical tasks. According to one teacher, comics has been used to engage their students in "discussing mathematics" during the lessons for the NT classes.
- There was also evidence, through our observation of the classroom lessons, that comics provide the platform to teach

21st century skills to students, and interview with students further supported our observation (Toh, Cheng, Ho, Jiang & Lim, 2017).

- One pleasant surprise to the researchers is that the use of comics could potentially facilitate the learning of mathematics among students with dyslexia, through an interview reported in Toh, Cheng, Ho, Jiang & Lim (2017).

## SIGNIFICANCE OF FINDINGS

### Implications for practice

In addition to using the standard teaching resource, teachers could consider using alternative material in teaching mathematics, under the framework of contextualization. Some students have difficulty learning abstract concepts, especially when they do not make sense. Thus, teachers could consider putting mathematics in context to facilitate student learning.

### Learning gains (for studies involving intervention)

The use of comics is a viable approach to teaching mathematics, especially among those who lack motivation or low self-concept.

### Proposed follow-up activities

The current era is one in which most information is not presented in the standard textbook format, but by using plentiful visual cues. The use of comics has the potential to engage students in this new form of literacy of obtaining and interpreting information through visuals, rather than the usual linear way presented in books. Not only that, we believe that the use of comics has the ability to stretch students' thinking and develop their higher order thinking skills (beyond the scope of this project).

## POPULATION

Three schools participated in this study. The class participants were their Secondary 1 NT classes in their schools. The teachers and students participated on a voluntary basis.

## RESEARCH DESIGN

In this study, the research team designed a package of comics teaching resource for selected units of lower secondary mathematics. The resource included several sets of comic strips that covered *all* the concepts in the selected units, tiered practice questions that covered the various concepts within the units, and proposed lesson outlines based on how to use the comics. Proposed lesson plans were provided for the teachers on how lessons using comics could be enacted. Storytelling was used as the main pedagogy in our proposal.

The teachers from the participating schools were briefed of the rationale of this non-traditional approach and how the lessons could be implemented. They taught the selected units using the comics package and were given the liberty to modify the package to meet the needs of their students without defying the underlying spirit of our project objective. The lessons were video-recorded.

After the lesson implementation, the researchers discussed with the teachers on how the package could be further fine-tuned. The pre-post student survey measured changes in students' motivation and academic self-concept. The researchers also studied how the teachers adapted the package during their lesson implementation.

## REFERENCES

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This brief was based on the project DEV 07/14 TTL: Mathematics is Great: I Can And Like (MAGICAL).

## How to cite this publication

Toh, T.L., Cheng, L.P., Jiang, H., & Lim, K.M. (2018). *Use of Comics in Teaching Mathematics*. (NIE Research Brief Series No. 18-005). Singapore: National Institute of Education.

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