

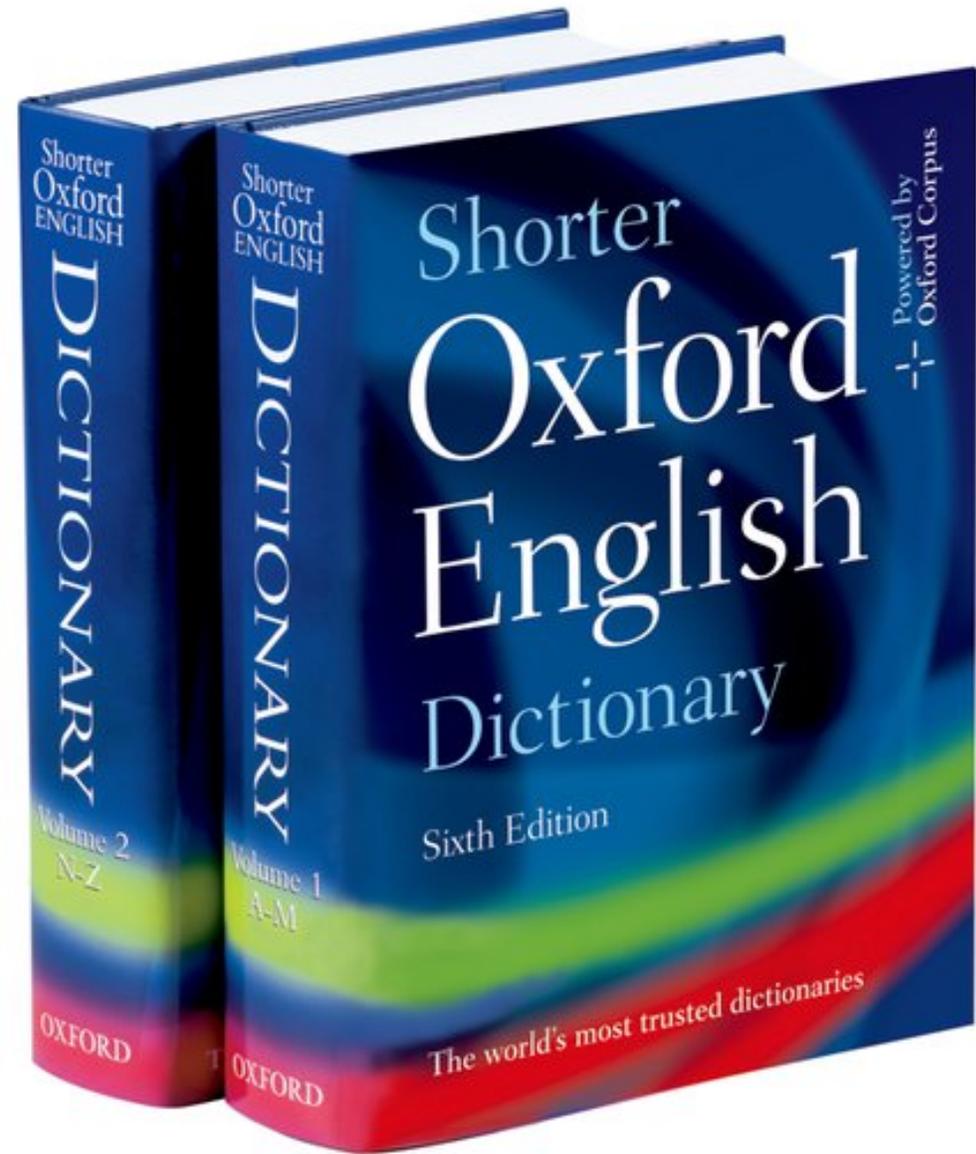
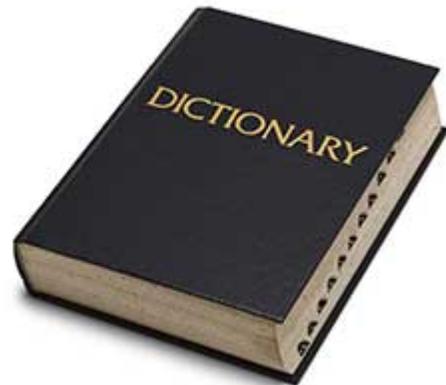
# Mathematics Education for Future Ready learners: A Singapore Experience

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# Introduction

- **The world today is different from 5 years ago. Projecting in this way, the world 5 years later will be vastly different from what we can imagine today.**



# Introduction

- **Help for the Low Attainers in Mathematics ...**
- **Not interested in mathematics ...**

# A Singapore Experience to help Low Attainers

- **A survey was conducted in 2013 for math teachers of low attaining students.**
- **What are the difficulties that the low attaining students face in mathematics?**
- **What are the efforts that teachers have taken to help address the learning difficulties?**

# A Singapore Experience to help Low Attainers

Difficulties classified under two broad categories:

- **Cognitive Factors**

- Low literacy skills
- Poor foundation in primary school math
- Confused by too many steps
- Unable to understand concepts
- Insufficient examples to understand the concepts
- Misconception not clarified

- **Affective Factors**

- Lack of self-confidence → not able to achieve success
- No satisfaction
- Discouraged by poor results
- Not resilient when facing setbacks **(Toh & Lui, 2014)**

# A Singapore Experience to help Low Attainers

- **Different approaches to tackle this problem:**
  - **Appropriate pedagogy to address the learning needs of the students (Education)**
  - **Making mathematics relevant to the students (Math Education)**
  - **Work on students' motivation and their self-efficacy (Educational Psychology)**

# A Singapore Experience to help Low Attainers

- **Teach mathematics not through the traditional approach.**
- **Use comics to engage the student from the beginning to the end.**
- **Use storytelling as the basic pedagogy**
- **Adopt active learning strategies.**

# A Singapore Experience to help Low Attainers

- **Selected several topics in the Lower Sec Math curriculum (5 topics in total: Percentage, Statistics I, Statistics II, Probability, Application of Mathematics)**
- **Complete sets of lesson outlines provided for the teachers (how storytelling can be used for the various parts of the lessons)**

# A Singapore Experience to help Low Attainers

- **The context of the comics provides an opportunity for students to deepen their understanding of the real world (contextual knowledge).**
- **The teachers interpret the context of the comics and provide an opportunity for students to be educated in civic and moral education, and National Education (knowledge more about Singapore and history of Singapore), and current issues (data protection).**

# A Singapore Experience to help Low Attainers

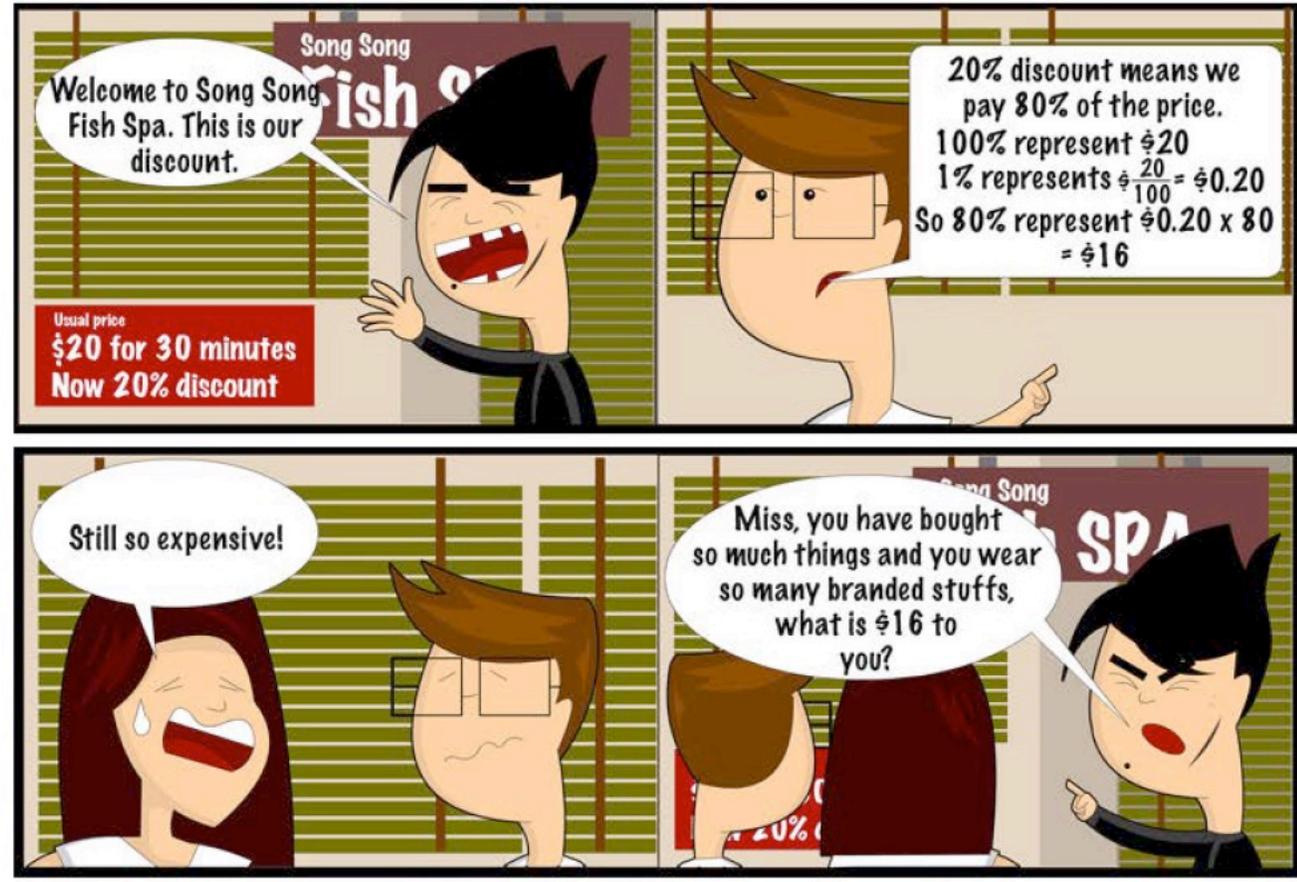
- **Opportunity to provide teachers with professional development (in both content and pedagogy).**
- **Re-examine mathematics content knowledge needed for teaching.**
- **Refresh and re-learn various pedagogical principles for teaching.**

# A Singapore Experience to help Low Attainers

- **The students to role-play, the teachers contextualize the context of the comics and for statistics, turn it into data collection process in a company, tabulate and represent the data, interpret the data.**

# Comics Research Project in Singapore

- Teacher “tells” stories to the students during the lessons, and the lessons involve the mathematical concepts within the context of the comics.



# Findings

- **Helps dyslexic student in deciphering information using more of visual cues.**
  - Information presented in comics are chunked and less wordy compared to typical mathematics word problems.
  - Gets interested and willing to read and re-read many times.
  - Consequently picked up the skills in the mathematics related topics.

**Note: result about impact on dyslexic students is not conclusive as we have only one case study.**

## Next Step

- **As we moved on further, we realized that our paradigm of using comics is equally applicable to other groups of students.**

# Next Step

- **Professional development for teachers (symposium for practicing teachers)**
- **Helping the low attainers ...**
- **Extend help to all other students ...**
- **Close the gap between research and professional development**