

Designing Web-based Video Cases for Teacher Learning and Teacher Development – The Singapore Experience

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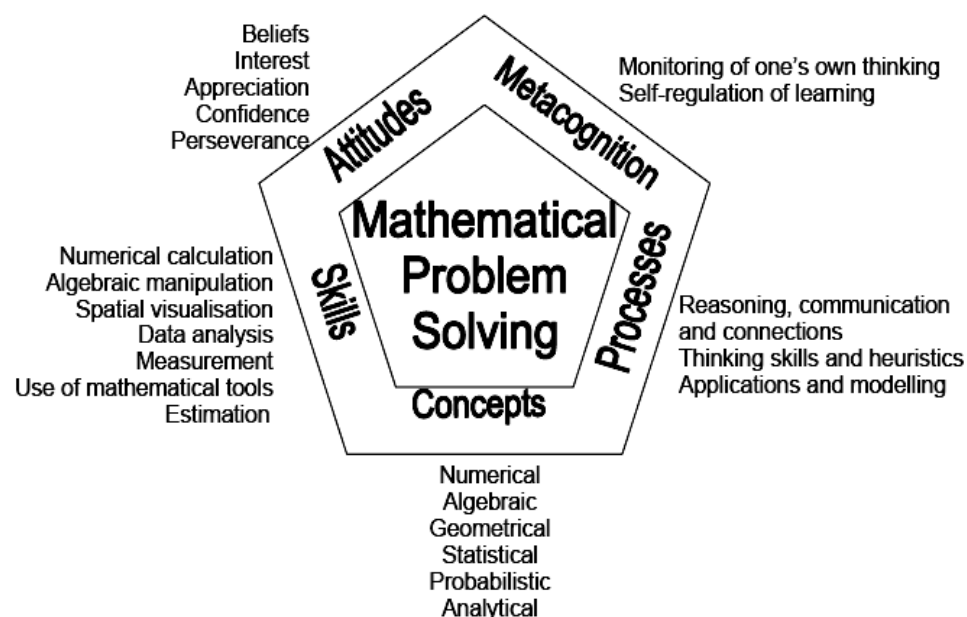
Murdoch University, Western Australia

Abstract

Video cases have been shown as effective tools to support teacher learning and teacher development. This study aims to design web-based video cases to support teachers in mathematical problem solving. Two video cases were built by drawing on data from a three-year funded project in Singapore. The first case is built on two Grade 5 teachers' different pedagogy in conducting problem solving activities while the second case draws on different challenges that two pairs of Grade 5 students experienced in the process of solving problems. The framing includes *case commentary*, guiding questions, and discussion forum to help users reflect on their practices and initiate peer-sharing and -learning among users. The long-term goal of the design is to build a virtual community of practice.

CRPP Project: Development Repertoire of Heuristics for Mathematical Problem Solving – Project 1 and 2 (2004 – 2007)

Singapore Mathematics Curriculum 2007
(minor revision from 1992 and 2001)

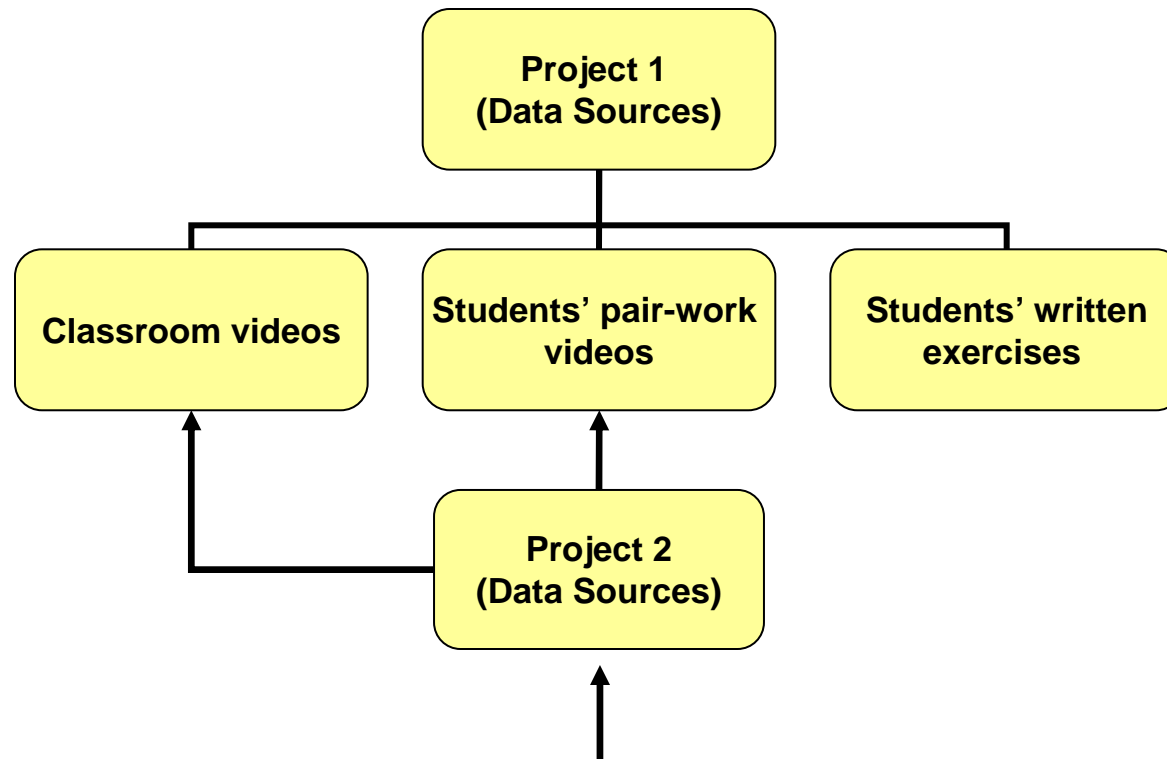


Project 1: Baseline data of implementing MPS curriculum in schools

Project 2: Designing web-based video cases to support teaching and learning of MPS in schools

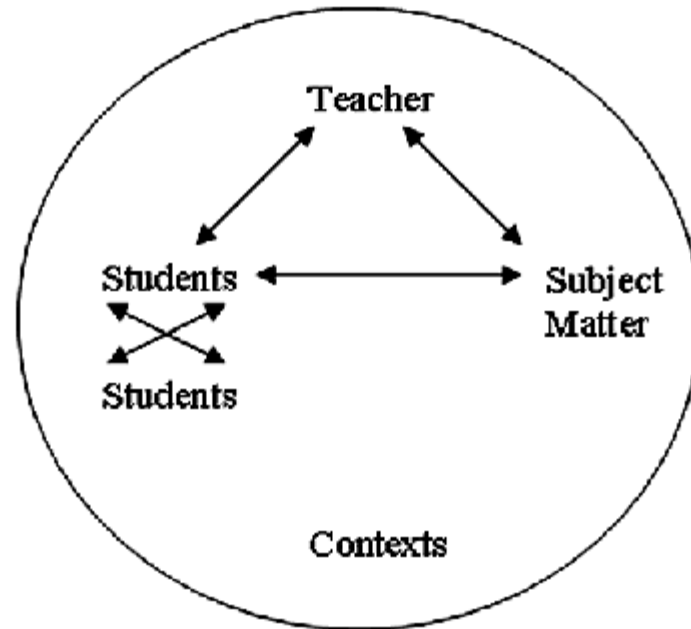
MPS – Project 1 and 2

Project 1: Baseline data of implementing MPS curriculum in schools



Project 2: Designing **web-based video cases** to support teaching and learning of MPS in schools

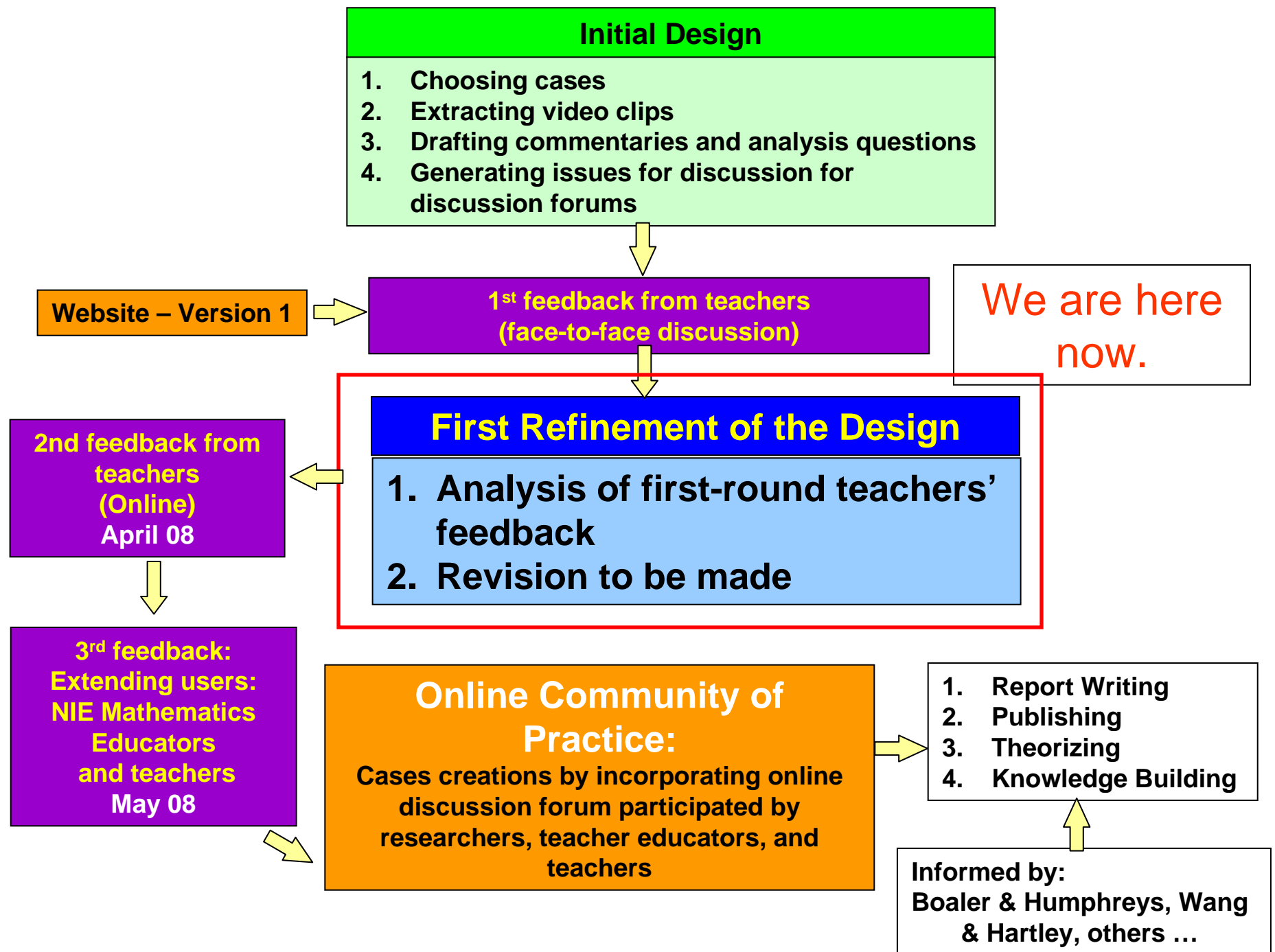
Conceptualization of video cases



The video cases focus on teacher student interactions in classroom teaching and student peer interactions in pair work in whole number and fraction word problems.

Ball and Cohen (1999)

Flow of the Design



Choosing Cases: 2 classrooms & 2 student pairs

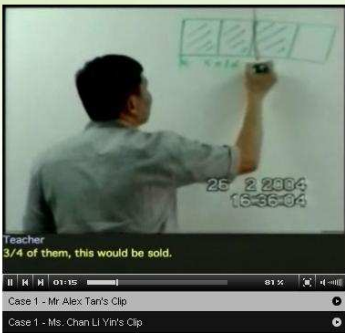
From 4 teachers'
classrooms

MPS1
Database

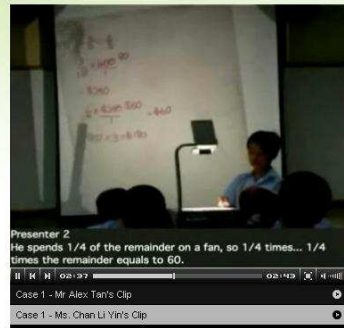
From 7 pairs, 5th grade

2 teacher episodes

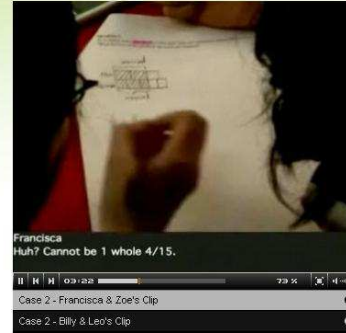
2 pair-work episodes



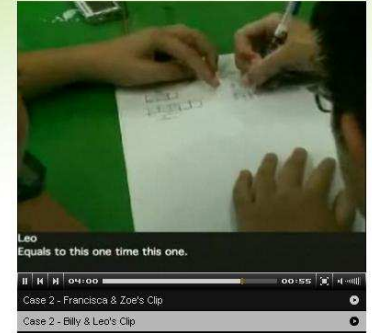
Alex Tan:
Teacher-led
discussion



Chan Li Yin:
Student-led
discussion



Fiona & Zoe:
Alex Tan's
students

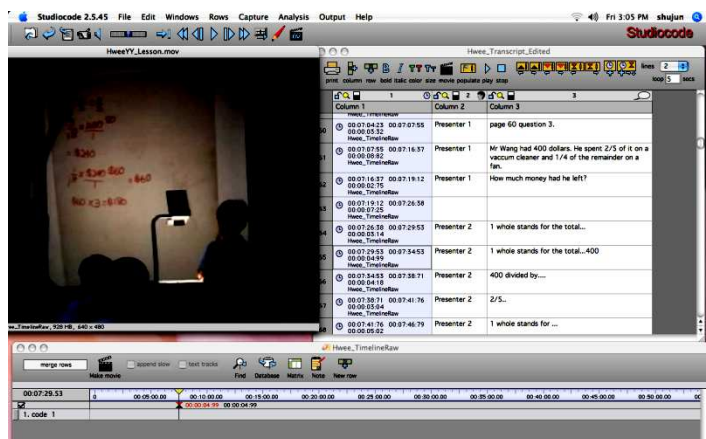


Billy & Leo:
Chan Li Yin's
students

Choosing cases to have a broader
the range of classroom practices

Understanding students' thinking
and challenges

Extracting video clips using Studiocode 2.5.45



Drafting commentaries & guiding questions for clip analysis

Guiding Questions to Zoe & Fransica's Video Analysis

Francisca & Zoe - Part 1: Drawing the first model, representing the info, and quick calculation

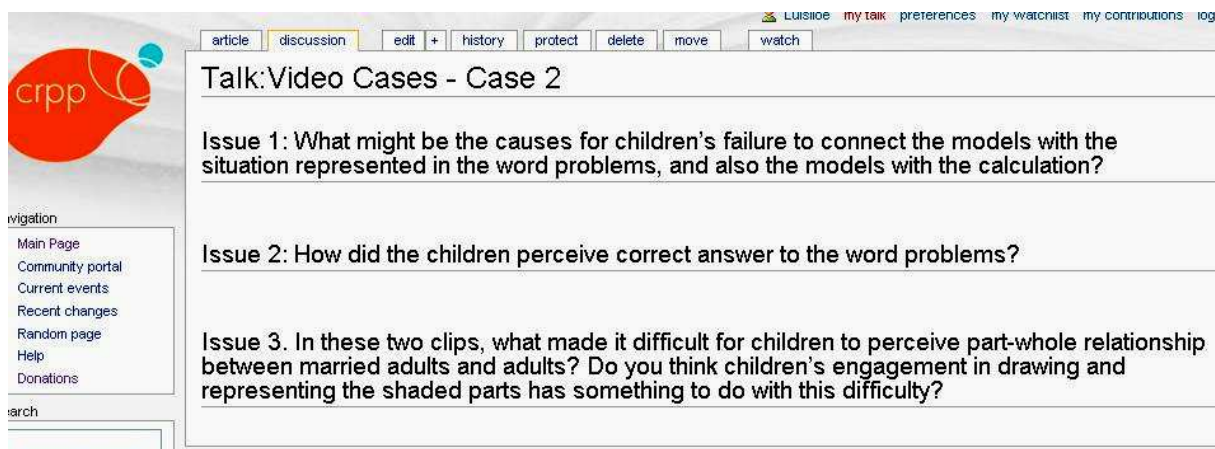
[Click here to view the videos for each part.](#)

Q1. How did Zoe and Francisca collaborate in drawing the model and representing the information?

Q2. Was the numerical expression " $2/3 + 3/5$ " connected with the model that they drew?

Q3. While Zoe was whispering "this is not according to the model", why did they still continue the calculation?

Generating issues for forum discussion



Website - Snapshots

<http://video.maths.crpp.nie.edu.sg>

Main Page

Main Page

Mathematical Problem Solving (MPS) Video Cases

Problem solving is a dynamic activity that requires higher-order thinking to approach problems in various ways, to choose effective solution strategies, and to constantly monitor and regulate the solving processes. For teachers, developing students' problem solving capacity, especially in mathematics, is essential though at the same time is not an easy task to fulfill. The dynamics nature of problem solving makes it impossible to have a fixed-and-single recipe to teach problem solving. Different student might have different learning experience and often they do not make their thinking overt that make it difficult for teachers to assess them and help them overcome their difficulties in learning. Furthermore, the standard to evaluate the development of students' capacity, both as a mean and an ends of a problem solving activity, also varies. The context of learning also depends on what the teachers believe in "what problem solving is", "what constitutes learning in a problem solving activity", "what are the tools to assess this learning outcome", etc.

Such dynamics of a problem-solving instruction in a classroom can therefore be seen as the ongoing interactions among teachers and students around educational materials such as word problems, questions posed to students by teachers, questions posed by fellow students, or questions posed by students to teachers. The dynamics of this instruction can be illustrated by the following model that is adapted from Ball & Cohen (1999).

Knowing and learning the interactions that occur in a dynamic of an instruction is an essential step for teachers to understand the effect of their teaching instructions. Based on this understanding, teachers might then think of how to modify their teaching strategies to enhance effectiveness of the instruction. Nevertheless, teachers' opportunity to reflect on the interactions that are happening in their classroom is The heavy pace demand to rush the syllabus and the deep engagement in the subject matter often make it difficult for teachers to take a third-party perspectives to analyse the teachers-students or students-students interactions around the materials discussed.

To address this issue, two video cases were designed to offer opportunity for teachers to learn how to understand and analyse the teachers-students and students-students interactions in the classroom. The first video case (referred to as Case 1) consists of two teachers'

Video Case Page

Teacher 2: Ms Chan Li Yin

There were seven consecutive lessons (Lesson 1-7) being observed in a unit of Fractions. The preliminary concepts of fractions had been taught prior to Lesson 1. In Lesson 1-4 the teacher has laid the ground for students to learn fractions and solve word problems involving fractions. In lesson 5, the teacher gave more active role and responsibilities for students by assigning word problems to be solved in a group. Each group was required to present and "defend" their working to the whole class. Only one group managed to do their presentation in Lesson 5, and hence the activities continued in Lesson 6. The clip was extracted from Lesson 6 in the series of our observation. Lesson 7, which was the closure of the unit of Fractions, was also conducted in group work and presentation manner.

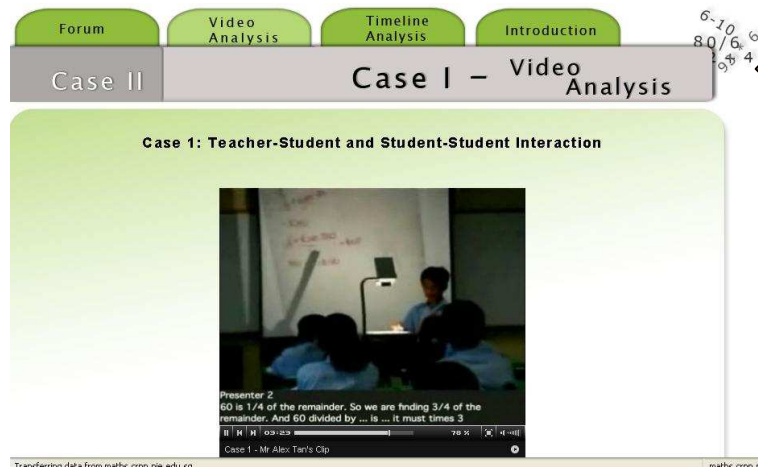
Lesson 1 Lab Session
 Lesson 2 Checking students' answers to assigned work; Quick check students' solution on the board, teaching skills, ends with seatwork.
 Lesson 3 Teaching fractions of a fraction and multiplication and division involving fractions; students seat work and quick check of answers.
 Lesson 4 Same pattern as Lesson 3, more explication on word problem, less time on teaching concepts/skills.
 Lesson 5 Going over assigned word problems, reinforcing concepts and problem solving skills; followed by group works. 1 group presented.
Lesson 6 Student presentations (continues from previous lesson), ends with seatwork.
 Lesson 7 Students' group work followed by presentation, ends with seatwork.

Timeline

Website - Snapshots

<http://video.maths.crpp.nie.edu.sg>

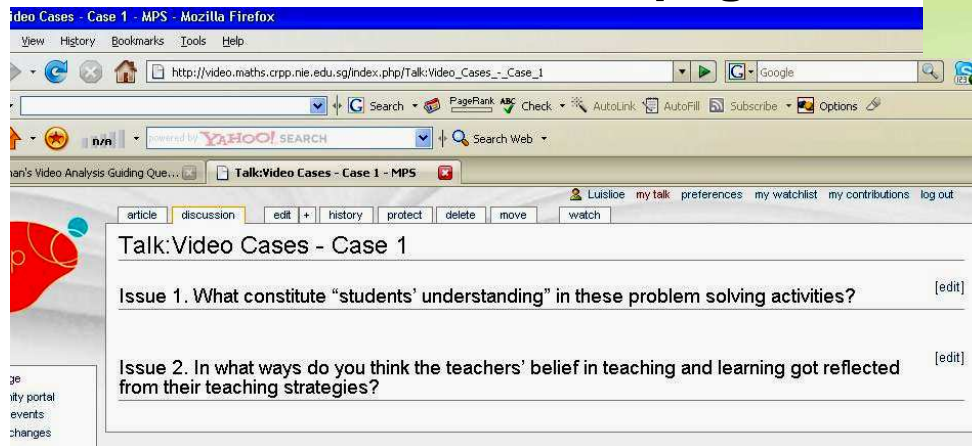
Video Clip



Clip analysis page

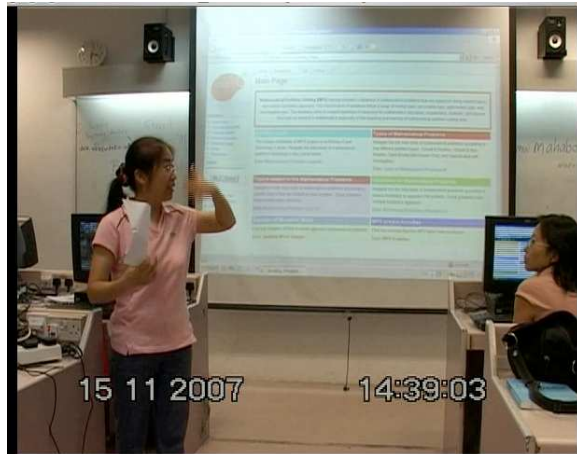
The screenshot shows a web browser window displaying the 'Ms. Chan's Video Analysis Guiding Question' page. The page has a green header and a form for user registration. The form includes fields for Name, Email, and School you are currently teaching at. Below the form, there is a link to 'Click here to view the videos for each part' and a section titled 'Ms. Chan Li Yin - Part 1: Students' presentation'. The first question is 'Q1. What did the student presenter struggle with?'. There is a text input field for the answer.

Discussion Forum page



Getting Teachers' Feedback

Sharing by Project Team



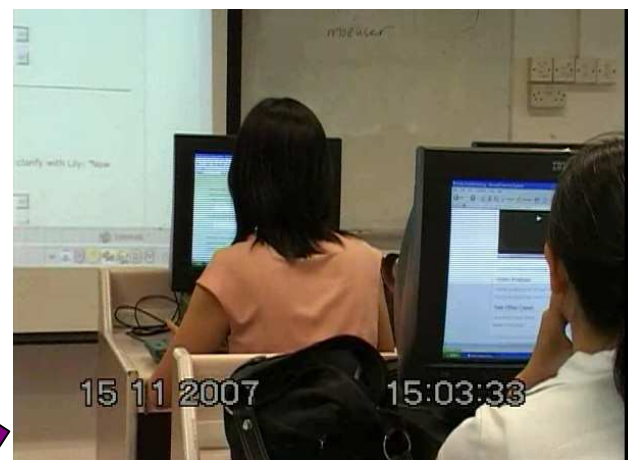
Watching video cases together



Round-table discussion



Teachers' trial of the Website



Analysis on the Teachers' Feedback

(Alex Tan's video and Francisca & Zoe's pairwork)

1. Interpreting Alex Tan's intention in conducting the segment

There are 2 interpretations : 1) Some teachers interpreted Alex as intending to check students' understanding; and 2) as intending to widen students' perspectives of the problem.

2. Interpreting Teacher-Student interaction

The teachers who watched the cases felt 1) the lesson was too didactic; 2) if they were to conduct the same segment in their own classes, they will encourage more students' discussion. One of them thought of using digital media to engage students.

3. Interpreting student pairs' reasoning

The teachers who watched the cases had attempted to interpret students' mental activities. Grade 7 teachers found it hard to understand 5th grade students' using of models and reasoning ...

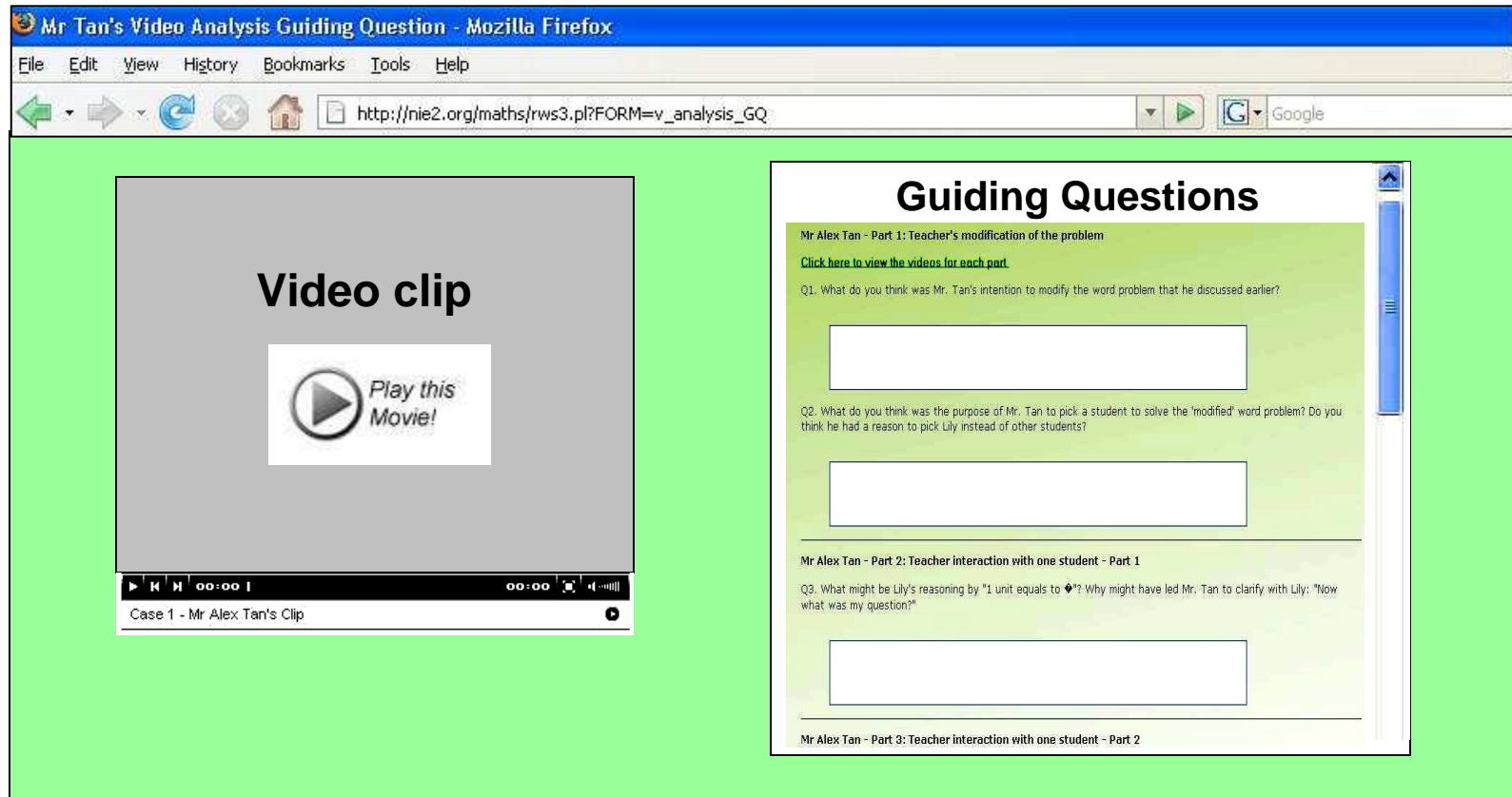
Analysis on the Teachers' Feedback (con't)

(Alex Tan's video and Francisca & Zoe's pairwork)

4. Although Alex Tan's way of conducting the segment of the lesson was reflected in the teachers' (who watched the cases) practices, the video cases had helped them to think of alternative teaching strategy that involve more students' participation.
5. One teacher suggested using the pair work cases to generate students' discussion in the classrooms

Revision to be made

1. User-friendliness consideration: Synchronizing video cases and analysis templates



2. Invite teachers to use pair-work video cases in their classrooms and use that to build a case

Reference

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