

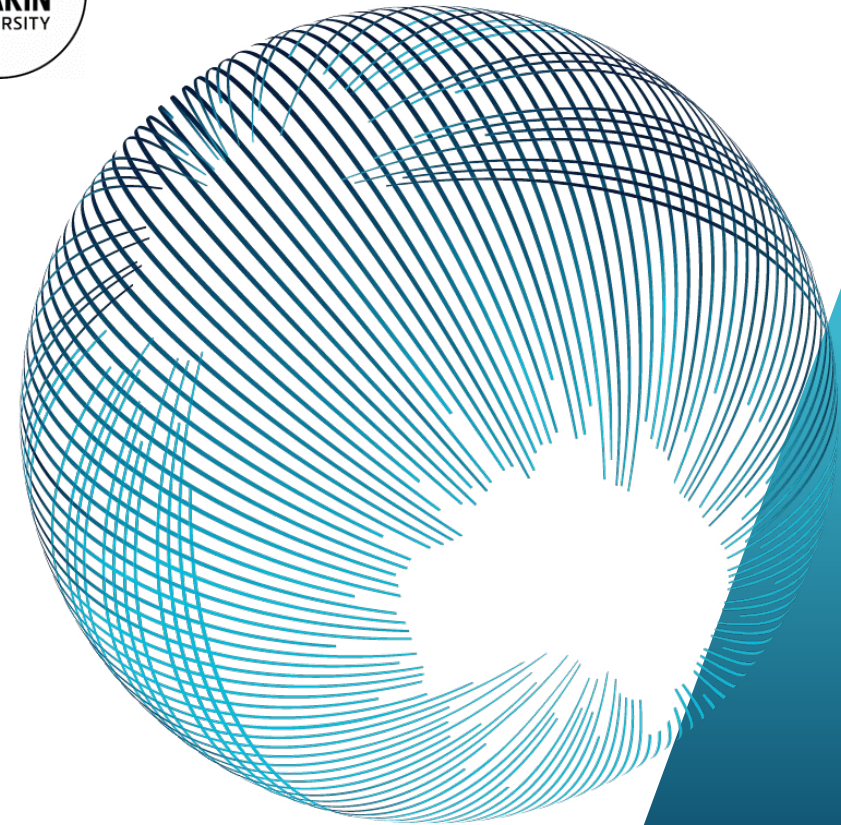


Australia Awards



Designing hybrid learning environment: Opportunities and challenges

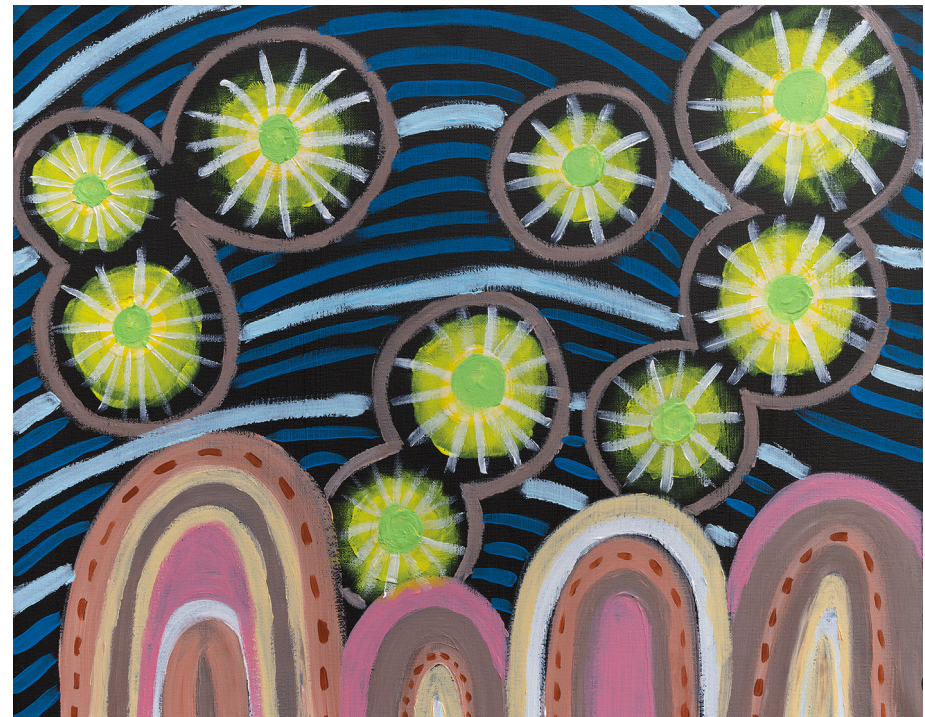
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★ Acknowledgment of Country

Today we are meeting on many lands and near to many waterways. We respectfully acknowledge the Traditional Owners of Country. Deakin University sits on the lands of the Wadawurrung Country. We pay respect to the ongoing living Cultures of First Peoples and to their Elders past, present and emerging. We recognise a history of truth, which acknowledges the impacts of colonisation upon Aboriginal and Torres Strait Islander people and stand for a future that profoundly respects their stories, culture, language and history.

Original Art work: Luana Towney
nipaluna / Hobart, Muwinina Country



Designing and delivering an online lesson study unit in mathematics to pre-service primary teachers: opportunities and challenges

Wanty Widjaja, Susie Groves and Zara Ersozlu
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Abstract

Purpose – The purpose of this paper is to describe the design and delivery of a lesson study unit in mathematics to pre-service primary teachers and to identify the opportunities and challenges resulting from the need to deliver the unit wholly online due to the COVID-19 pandemic.

Design/methodology/approach – Cross-case analysis, using a before-and-after design, was used to compare the development and delivery of the unit in 2019 and 2020, with the pivotal event of interest between the before-and-after cases being the onset of the COVID-19 pandemic.

Findings – The content and structure of the unit, as well as its collaborative aspects, remained substantially the same in the before-and-after cases. While there was a low level of engagement with pre-recorded lectures, there was a high level of engagement and participation in the online synchronous seminars, together with a marked increase in overall satisfaction with the unit. Pre-service teachers were unable to teach and observe one another's planned research lessons in school. Instead, after a detailed examination of the task, the lesson plan and student solutions, they observed a pre-recorded video of a research lesson at a local school and participated in a streamed post-lesson discussion. Pre-service teachers regarded this new component as a highlight of the unit and an important connection between the theory and practice of lesson study.

Originality/value – The inclusion of the video-recorded research lesson in 2020 introduced a new level of authenticity for pre-service teachers, allowing them to observe a high quality structured problem solving mathematics lesson taught in a local public school, as part of a local implementation of lesson study—something that is not generally possible. While there is often a view that the benefits of lesson study result mainly from collaborative planning and teaching of the research lesson, this paper highlights the value of involvement for all participants in research lesson observation and post-lesson discussion, as well as the opportunities afforded by the use of “virtual lesson study”.

Keywords Lesson study, Mathematics, Teacher education, Online teaching, Structured problem-solving lessons, COVID-19

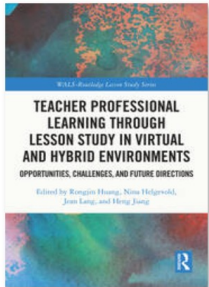
Paper type Case study

1. Introduction

According to Makinae (2019), Japanese lesson study originated in Tokyo's normal school (teacher training college) in the late 19th century and later spread to include in-service teacher professional development. Worldwide interest in Japanese lesson study as a vehicle for professional learning was largely sparked by Yoshida's (1999) doctoral dissertation and Stigler and Hiebert's (1999) accounts of Japanese structured problem-solving lessons, based on the *Third International Mathematics and Science Study* (TIMSS) video study. Since then, there has been phenomenal growth worldwide in lesson study as a vehicle for teacher professional learning, as well as, to a lesser extent, in pre-service teacher education.

This paper reports on the design and delivery of a one-trimester lesson study unit in mathematics as part of a four-year Bachelor of Education (Primary) course. The unit was first taught across three campuses in the second half of 2019, using a hybrid model of face-to-face and online teaching. However, due to the COVID-19 pandemic, all teaching at the university had to be delivered wholly online during the second half of 2020.





Chapter

What can online lesson study offer?

Findings from an Australian-Japanese collaboration

By Susie Groves, Toshiakira Fujii, Wanty Widjaja, Keiko Hino, Naoko Matsuda, Felicity Ames

Book [Teacher Professional Learning through Lesson Study in Virtual and Hybrid Environments](#)

Edition	1st Edition
First Published	2023
Imprint	Routledge
Pages	17
eBook ISBN	9781003286172

ABSTRACT

This chapter aims to show the potential of international online lesson study to deconstruct both mathematics classroom practice and the process of lesson study itself, thus deepening our knowledge of both our own and the 'other's' practices. The chapter is based on an analysis of the second of two online, interactive, lesson studies conducted as Zoom webinars as part of an Australian-Japanese collaboration. The webinars were based on archival video from a Japanese and an Australian research lesson, with participants expected to engage with rich resources in advance. Evidence shows that having time to repeatedly access the video and other materials enabled the participants to analyse the children's work and the classroom discourse more deeply than is usually possible, provoking questions about the curriculum, the tasks we use, and what we believe to be good lessons and why.

Rationale for ESM303

The Teacher Education Ministerial Advisory Group (TEMAG) noted the declining engagement and participation of students in maths and science, as well as the lack of confidence that teachers have in these areas. Poor engagement with maths and science in the early years of formal education was identified as a critical link in the chain of students completing school with skills and knowledge in these areas and graduates being qualified to teach maths and science.

TEMAG recommended that:

*Higher education providers equip all primary pre-service teachers with at least one subject specialisation, prioritising science, mathematics or a language. Providers publish specialisations available and numbers of graduates from these programs
(TEMAG Report p22)*



Accreditation of initial teacher education programs in Australia

Guideline: Primary Specialisation (Program Standard 4.4)

Program Standard 4.4

In addition to study in each of the learning areas of the primary school curriculum sufficient to equip teachers to teach across the years of primary schooling, programs provide all primary graduates with a subject specialisation through:

- clearly defined pathways into and/or within a program that lead to specialisations, that are in demand, with a focus on subject/curriculum areas
- assessment within the program requiring graduates to demonstrate expert content knowledge, pedagogical content knowledge and highly effective classroom teaching in their area of specialisation
- publishing the specialisations available, and numbers of graduates per specialisation through their annual reports.

From the Accreditation of Initial Teacher Education Programs in Australia: Standards and Procedures

This guideline provides further details regarding Program Standard 4.4 and should be considered binding for accreditation panels.

Policy intent

The Teacher Education Ministerial Advisory Group (TEMAG) noted the declining engagement and participation of students in maths and science, as well as the lack of confidence that teachers have in these areas. Poor engagement with maths and science in the early years of formal education was identified as a critical link in the chain of students completing school with skills and knowledge in these areas and graduates being qualified to teach maths and science.

Development of ESM303

Week	Topics	Learning activities
1	Introduction to lesson study	Key features of lesson study and structured problem-solving mathematics lessons.
2	Researching teaching materials in lesson study	<i>Kyozaikenkyu</i> – In-depth study of relevant materials.
3	Designing lesson study goals, topics and tasks.	Selecting and adapting problem-solving tasks for the research lesson – the <i>hatsumon</i> .
4	Analysing evidence of students' mathematical learning	Anticipating students' strategies and solutions. Evidence-based reflection.
5	Orchestrating a whole-class discussion – <i>neriage</i>	Selecting and sequencing student solutions for discussion. Engaging students in whole-class discussion. Documenting lessons on the board – <i>bansho</i> . Linking the summary to the mathematical goals.
6	Observing research lessons and the post-lesson discussion	Observing research lessons. Key aspects of the post-lesson discussion. The role of the knowledgeable other.
7 and 8	The research lesson and post-lesson discussion	Teach/observe a research lesson and participate in post-lesson discussions.
9	Establishing lesson study communities	Reflections from the planning teams and feedback from the knowledgeable others. School-based lesson study.

Table 1.
Structure of the lesson study unit as planned

Widjaja, W., Groves, S. & Ersozlu, Z. (2021). Designing and delivering an online lesson study unit in mathematics to pre-service primary teachers: opportunities and challenges. *International Journal for Lesson and Learning Studies*. Vol. 10 No. 2, 230-242. doi:10.1108/IJLLS-10-2020-0080.

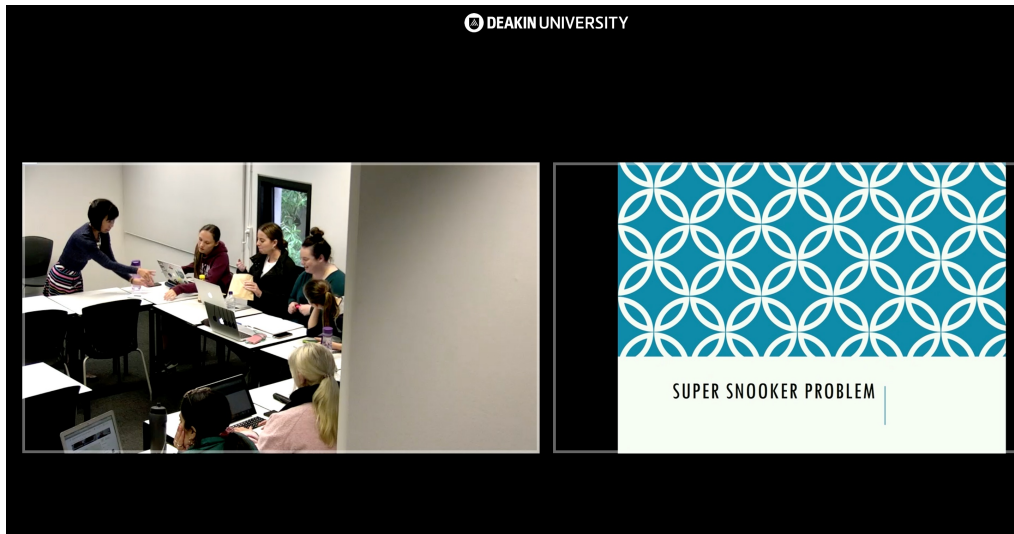


DEAKIN UNIVERSITY

The video player displays two scenes. The left scene shows a classroom with students seated at tables, engaged in a lesson. The right scene shows a presentation slide with a teal and white geometric pattern. The slide text reads: 'DESIGNING LESSON STUDY GOALS, TOPICS, AND TASKS', 'ESM 303 PRIMARY MATHEMATICS LESSON STUDY', and 'Dr Wanty Widjaja w.widjaja@deakin.edu.au'. The video player interface at the bottom shows 'Paused', '0:07:28 / 2:54:52', and various control icons.

2019
Ftf at Burwood
and Geelong,
VMP to
Warrnambool

2020
Ftf at Burwood
(W1) then
wholly online



Burwood campus



Geelong campus

Warrnambool campus

Designing tasks to meet lesson study goals ▾



Introduction

In Week 3, we will focus on designing appropriate tasks to meet Lesson Study goals. Please navigate to useful resources and websites listed below to explore different lessons and tasks in relation to the curriculum goals in respective countries. Note that Year 3/4 lesson plan from South Geelong primary school is the research lesson plan. Click on the following link to Lesson Study Alliance at Chicago to learn more about prompts and questions we can pose to ourselves to engage in the process of researching teaching materials or *Kyouzai-kenkyuu*. <http://www.lsalliance.org/resources/kyouzai-kenkyuu/>

Planning for a research lesson in Lesson Study



<https://youtu.be/JMIRIRro86E>

AITSL Illustration of practice on achieving explicit learning goals



Readings

Prescribed readings

Clarke, B. & Sanders, P. (2009). Tasks involving models, tools and representations: making the mathematics explicit as we build tasks into lessons. *Australian Primary Mathematics Classrooms*. Vol. 14(2), 10-14.

Stacey, K. (1989). Finding and Using Patterns in Linear Generalising Problems. *Educational Studies in Mathematics*. 20(2), 147-164.

Tall, D. (2006). Using Japanese lesson study in teaching mathematics. *The Scottish Mathematics Council Journal*. 38: 45-50. Retrieved from <https://homepages.warwick.ac.uk/staff/David.Tall/pdfs/dot2008d-lesson-study.pdf>

Recommended readings

Fujii, T. (2016). Designing and adapting tasks in lesson planning: a critical process of Lesson Study. *ZDM Mathematics Education*. 48: 411-423.

Stacey, K. (2015). Mathematical thinking for classroom decision making. In M. Inprasitha; M. Isoda; P. Wang-Iverson; B-H. Yeap (2015). *Lesson Study: challenges in mathematics education*. Singapore: World Scientific.

Liljedahl, P. & Cai, J. (2021). Empirical research on problem solving and problem posing: a look at the state of the art. *ZDM Mathematics Education*. 53:723-735. <https://doi.org/10.1007/s11858-021-01291-w>

[Year 3/4 Lesson Plan South Geelong Primary](#)

[Year 4 Lesson plan Creekside 'Array problem'](#)

[23 x 3 Lesson plan Hideyuki Muramoto](#)

[23 x 3 Lesson episodes from Hideyuki Muramoto](#)

Useful resources

Problem-solving tasks in Lesson Study from The Lesson Study Group at Mills College, CA. <https://lessonresearch.net/resources/content-resources/>

Lesson Study library from International Math-Teachers Professionalization Using Lesson Study (IMPULS) at Tokyo Gakugei University, Japan. <http://www.impuls-tgu.org/en/library/index.html>

Lesson plan resources from Chicago Lesson Study group. http://www.lessonstudygroup.net/lg/lesson_plans_table.php?clsg=1



THE CASE OF A TEACHER WHO UNDERSTANDS THE IMPORTANCE OF ANTICIPATING STUDENT RESPONSES – WATANABE (2001)

FROM AN INTRODUCTORY LESSON ON DIVISION WITH FRACTIONS

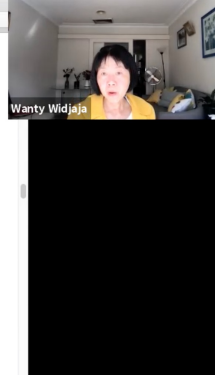
A fourth-grade teacher posed the following four division problems and asked the students to find the answers by using what they had already learned:

- $3/5 \div 1/5$
- $2/5 \div 3/4$
- $1 \div 2/5$
- $2 \div 1/4$

The teacher gave them some time to analyse the problems and asked them to tell him which problems they could solve most easily.

Many students responded that they knew that the answer to the first one was 3 and that the answer to the last one was 8.

Then the teacher began the whole class discussion by posing the problem $2 \div 1/4$.



2021 Week 6 Semi...

5

6

7

8

9

10

Let's think about different ways to represent and solve $1 \div 2/5$

$$\frac{1}{1} \div \frac{2}{5} = \frac{5}{2} = 2.5$$

$$\frac{5}{5} \div \frac{2}{5} = \frac{25}{10} = \frac{5}{2} = 2.5$$





$$1/0.4 = 0.25$$

$$10/4 = 2.5$$

00:34:55 01:50:12

Learning Opportunities for PSTs

- High level of engagement in online and hybrid synchronous seminars
- Power of solving mathematical problems themselves (anticipating)
- Identifying multiple solution pathways
- Fostering collaboration and collegiality
- Marked increase of student satisfaction
- Access to knowledgeable others through video of research lesson in Australian primary school

<p>Grp 2  easiest</p> <p>Counting method - Counting one by one</p> <p>Next step: "what stays the same and what changes?" - get them to notice it goes up by 3 each time, prompt thinking through questioning</p>	 <p>*anticipated mistake* Doubling Approach Children would count that 13 matchsticks make up 4 squares, double 13, then arrive at the incorrect solution that 26 matchsticks are used to make 8 squares. This doesn't account for the matchstick shared between each set.</p>
 <p>Adding method -Add 3 everytime a new square is added</p> <p>This solution would be accurate yet take a great portion of time.</p>	 hardest <p>Algebraic Approach $3s+1=m$ where s is number of squares and m is number of matchsticks</p> <p> $4+3(s-1)=m$ $3 \times 8 + 1 = 25$ $4s-(s-1)=m$ 25 matchsticks for 8 squares </p>

Challenges

- Fostering critical inquiry and being reflexive (post lesson discussion)
- Tensions between research informed pedagogical approaches in mathematics and apprenticeship of observation, identity as a future primary teacher of mathematics
- Timing and opportunities for reflection
- Fostering culture of whole class discussions (not explicit teaching) in mathematics



Time to hear from you

- Share a post of your reflection on hybrid learning experience that you had design/participate
- Draft an action plan for digital transformation in your own work
- Identify any support do you need from your institution to make this happen.





Thank you



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Thank You

More information:

<https://www.dfat.gov.au/people-people/australia-awards/australia-awards-fellowships/applying-australia-awards-fellowship>

Fellowships email: fellowships@dfat.gov.au