
Title	Teacher learning from a socio-cultural lens: A case of Singapore
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Teacher learning from a socio-cultural lens: A case of Singapore

Teacher learning is key for quality teaching and learning. Schools leverage situated teacher learning to develop teachers' capacities. However, situated teacher learning is ambiguous. How teachers learn is shaped by socio-cultural factors. This paper elaborates upon a case study of situated teacher learning in Singapore in which teachers learn in a community to design innovations and enact student-centred practices. Cultural Historical Activity Theory (Engeström, 2001) is used as a lens to unpack situated teacher learning and its socio-cultural dimensions at macro and micro levels. *Macro level* findings show the collective socio-cultural elements in the entire situated teacher learning process involving real issues and communities. *Micro level* findings discuss each event within the situated teacher learning process, understand the contradictions teachers faced, decisions they made, and the individual and social interactions that led to teachers' expansive understandings of student-centred practices for their contexts. Findings illustrate how situated teacher learning engages teachers in reflective inquiry and a generative process of unpacking what student-centred practices mean for their contexts. Findings show that situated teacher learning is a collective endeavour. It requires the teacher community to experience collective inquiry, navigate the demands of school and policy contexts, and create socio-cultural supports to address challenges. (199 words)

Keywords: situated teacher learning; Cultural Historical Activity Theory; socio-cultural; community; knowledgeable others

Introduction

Teacher learning is key for quality teaching and learning (Hattie, 2009, 2012). Typical teacher learning takes a cognitive view. Knowledge is packaged, delivered in workshops, and assumed to impact practice. A socio-cultural stance to teacher learning can be more meaningful because professional learning is situated in classrooms by inquiring complex problems (Ng & Tan, 2009). Teachers learn in communities with knowledgeable others to implement new practices (Borko, 2004).

Research indicates that the ways teachers learn and inquire about their practices are ambiguous (Timperley, 2008). Teacher learning is shaped by school contexts and constructed through individual and social interactions (Hamilton, 2004; Leinhardt, 1988). Thus, this paper considers this research question, *“In communities, how do teachers learn, and what are the roles of knowledgeable others?”*. This paper elaborates a case study of teacher learning in which teachers design innovations and implement student-centred inquiry practices.

The case study is situated within a major educational reform initiative called “Teach Less, Learn More” (TLLM). TLLM, under Singapore’s vision of “Thinking Schools, Learning Nation” (TSLN), moves away from academic outcomes to include holistic education, student-centred learning, creativity, and innovation (Gopinathan, 2007; Tan & Gopinathan, 2000). *The Singapore education system adopts a centralised-decentralisation approach (Tan & Ng, 2007). While there is a centralised curriculum, decentralisation is promoted by giving schools spaces for innovations. Teachers are given the autonomy and resources to inquire about their practice and transform learning for local needs.* This paper unpacks nuances of how teacher learning is shaped by policy, school context, and communities. Teachers learn by inquiring about classroom issues and seeking alignments with centralised policies.

Literature review

Moving teacher learning from a cognitive to a socio-cultural phenomenon

Teacher learning is a process through which teachers develop professional expertise, acquire knowledge and skills, and apply them to classrooms (Kelly, 2006). Typical teacher learning approaches take a cognitive perspective to emphasise a binary relationship between the subject (teacher) and object of learning (Boisvert, 1998). Knowledge is packaged (such as in lecture notes) and delivered to teachers in purposefully designed settings (such as workshops). Cognitive views of teacher learning focus on the individual and their own sense-making. Cognitive stances, generally, do not consider communities' roles in the meaning-making process.

From a cognitive viewpoint, knowledge is assumed to be learnt and useful for practice (Garet, Porter, Desimone, Birman, & Yoon, 2001; Kelly, 2006). There is limited support for adapting understandings to practice. Thus, cognitive stances de-emphasise tacit knowledge and downplay the complex realities that teachers face when applying knowledge to practice. (Cochran-Smith & Lytle, 2009; Nelson, 2009; Webster-Wright, 2009). Research shows that teacher learning that is not situated in classrooms rarely impacts practice (Garet et al., 2001; Vetter, 2012).

In Singapore, under TSLN, teachers are expected to be designers of learning experiences (Ho, 2018). Teachers engage in innovations and student-centred practices whilst maintaining academic outcomes. Teachers may face challenges because they are objects of past pedagogies. They may not have experiences with student-centred practices (Sparks, 1997). Thus, cognitive views of teacher learning may not suffice. Teachers need to learn with communities and develop professional insights by inquiring about issues and designing innovations in schools (Borko, 2004).

Contemporary, socio-cultural views of teacher learning differ because they take a *situated, distributed orientation* towards professional learning that is embedded in practice and schools (Stollar, Poth, Curtis, & Cohen, 2006; Wenger, 1998). This view recognises teacher learning and knowledge as co-constructed and transformed within communities (Lave & Wenger, 1991; Putnam & Borko, 2000). Socio-cultural stances relate to teacher learning as *situated teacher learning* because it involves creating “lived” experiences where teachers, contexts, and learning are all intertwined. Teachers learn by relating to individual and collective situations. As individuals, teachers become “reflective practitioners” (Schön, 1995) and “architects of change” (Chapman & Heater, 2010; Vetter, 2012) by addressing classroom tensions and teachers’ inner reflections (Levin & Rock, 2003; Vetter, 2012). As a community, teachers critically examine issues, make informed decisions, and establish common understandings. Teachers become inquirers reflecting in and on action – starting with a problem, designing and enacting an innovation, followed by reflecting and identifying issues for further inquiry (Bray, Lee, Smith, & Yorks, 2000; Nelson, 2009; Schön, 1995).

The central idea underpinning the socio-cultural stance of teacher learning is that professional learning must be situated in authentic contexts. The contexts and activities in which teachers learn is a fundamental part of what and how they learn. The school and classroom are important physical and social contexts for situating teacher learning. These contexts determine how and what teachers learn. The focus in the cognitive stance of teacher learning is on the individual teacher. However, in the socio-cultural stance, teacher learning is situated in communities where the individual is a participant. The cognitive stance is less concerned about how teachers learn but in the socio-cultural stance, teacher learning involves interactions in social settings. Teacher learning is situated as part of the enculturation process into a community’s way of thinking and

learning. From a cognitive perspective, teacher learning is unilateral. In a socio-cultural stance, the teacher learning process and knowledge evolve with ideas generated by and brought in by members of the community.

Yet, both stances of teacher learning are not dichotomous. It is possible for teachers' learning experiences to evolve from cognitive towards more socio-cultural views. For example, teachers may learn about theories in workshops. Subsequently, teachers may discuss and make sense of these theories in their respective schools. They may work with colleagues to adapt and trial theories in classrooms.

Although the socio-cultural view recognises the value of teachers inquiring about their practice, how teachers learn remain ambiguous. This is because teacher learning is shaped by context, and individual and social interactions (Hamilton, 2004; Leinhardt, 1988; Timperley, 2008). There are limited understandings of how teachers navigate the situated teacher learning process, particularly how teachers identify issues and scope their inquiry (Yendol-Hoppey & Dana, 2010; Hamilton, 2004). Thus, this study unpacks nuances of teachers' inquiry process, such as challenges teachers face and how their community supports teacher learning based on school's needs.

Communities as an important context for situated teacher learning

In Singapore, TLLM and TSLN mark a shift from teacher-centred to student-centred practices. [Schools are given autonomy to create school-based innovations. Teachers may lead innovations that meet local needs and yet remain strategically aligned with policies](#) (Ng, 2017; Tan & Ng, 2007). Teachers learn in communities, as part of their practice, to address real problems. Top-down support is given so teachers engage in school-based innovations while ensuring synergies with system-level, strategic directions.

Consequently, Singapore schools embark on situated teacher learning to build teachers' capacities for innovations (Gopinathan, 2007; Ng, 2017; Tan & Gopinathan, 2000; Tan & Ng, 2007). There are different ways schools approach teacher learning while considering individuals' needs and schools' socio-cultural dimensions. These efforts include (1) involving teachers in designing innovations, (2) encouraging teachers to inquire about their practice in professional learning communities and (3) exposing teachers to innovative ways of teaching (Tan, Ponnusamy, & Tan, 2018).

As communities and contexts play a key role in situated teacher learning, this study aims to understand the roles and scaffolds that communities afford to help teachers overcome issues in their professional learning journeys. Teacher learning may manifest differently [in Singapore. Teachers in Singapore are allowed to inquire about student-centred practices by designing school-based innovations while aligning with centralised policies.](#) The dynamics of individual and community interactions vary in different situations to show complexities of how teachers learn and inquire about their practice (Opfer & Pedder, 2011). Teachers no longer work as technicians. They become decision makers and designers of students' learning experiences (Connelly & Clandinin, 1985; Davis, Sumara, & Luce-Kapler, 2000; Eisner, 2002).

Enablers of situated teacher learning in communities

Situated teacher learning in communities embraces socio-cultural views and considers knowledge as created in teachers' daily work and critical reflections with colleagues. It is assumed that teacher learning with active engagement in communities enhances professional knowledge and student learning (Buysse, Sparkman, & Wesley, 2003; Vescio, Ross & Admans, 2008). The community needs to have capacities to facilitate and sustain teacher learning with a common goal of improving student learning (Bolam et al., 2005).

Productive teacher learning in communities, therefore, exhibits particular characteristics. There are physical and human conditions that enable teachers to contribute to the collective learning activity (Vangrieken, Meredith, Packer, & Kyndt, 2017). There is supportive and shared leadership from school leaders. Teachers are given authority to make decisions in their learning process. Members in the community learn collaboratively by focusing on shared values, visions, and goals. Teachers share their individual practice in non-evaluative ways. These conditions enable teachers to develop ownership of their innovation and learning process. Members also develop collective responsibility to apply new knowledge and improve practice. Vescio et al. (2008) similarly highlight characteristics of teacher learning in communities that impact practice and learning. These characteristics include a focus on collaboration, student learning, giving teacher authority, and sustained efforts.

Literature shows communities as powerful contexts of situated teacher learning when interactions stress collaborative inquiry, decision making, and negotiations centre on knowledge building about instructional practices (Popp & Goldman, 2016). Yet, situated teacher learning is contextually nuanced and intertwined with teachers' professional lives, communities, and school conditions. Thus, it is useful to study different instantiations of situated teacher learning to understand how it is influenced by a confluence of socio-cultural factors and stakeholders that relate to the teacher, school community and learning activity. Productive teacher learning is interactive and sustained when there is coherence in learning activity, teachers' daily work, and schools' needs (Opfer & Pedder, 2011; Vangrieken et al., 2017).

Cultural Historical Activity Theory as a theoretical lens

This study adopts Cultural Historical Activity Theory (Engeström, 2001) ([CHAT](#)) as a theoretical lens to understand how teachers engage in *situated teacher learning* in

communities and the roles of knowledgeable others. **CHAT** is a cross-disciplinary framework for studying different practices, how practices develop within particular socio-cultural context and conditions, as well as the use of tools and artefacts at both the individual and social levels in the process (Kuutti, 1996). **CHAT** provides a powerful and descriptive framework because it focuses on a “mediated activity system”, comprising the individual practitioner, colleagues and co-workers of the community, the conceptual and practical tools used, and the shared objects as a unified dynamic whole (Engeström, 2001).

[insert Figure 1 here]

Figure 1 shows the activity system for how teachers learn in communities to design innovations and inquire about student-centred inquiry practices. The activity of concern is teachers learning to design and implement student-centred inquiry practices in classrooms. Teachers participate in this activity to achieve an object (or goal) and outcome. The object (or goal) is for teachers to implement student-centred practices so two outcomes are attained: (1) students learn using student-centred inquiry practices and (2) teachers become leaders of innovations and student-centred practices.

The learning activity is supported by members of the community, including knowledgeable others such as experienced teachers within the school and researchers beyond the school. The community may leverage scaffolds, lesson plans, and strategies as tools to support the innovation and teachers’ inquiry of student-centred practices. Different members may contribute differently to the teacher learning activity. For example, enacting teachers would implement lesson plans as well as explain classroom experiences and issues. Researchers could contribute possibilities and strategies to address classroom situations. Experienced teachers’ role is to provide contextual insights to customise strategies for schools’ needs.

The learning activity is situated against a backdrop of school rules and TSLN's mandates. Schools and teachers have spaces to design school-based innovation for local needs. However, they must remain strategically aligned with policies.

CHAT aligns with this study because it employs the same socio-cultural paradigm as situated teacher learning to systematically unpack the interactions and socio-cultural conditions for teacher learning in communities. For successful teacher inquiry and student-centred practices to happen, certain changes are necessary. These changes may pose tensions and afford opportunities to improve practices when modifications are made to address conflicts in the activity system.

Particularly, CHAT emphasises the challenges and gaps teachers face as contradictions. These contradictions afford expansive learning opportunities as teachers explore what works and does not work with knowledgeable others and members in the community. These interactions are useful to understand how teachers reconceptualise new practices and open up possibilities for how student-centred inquiry practices look like in their classrooms.

Research design and methods

This study involves a case study of one primary school. Case study research is useful to describe events that happen in everyday contexts (Yin, 2018). The case study approach aligns with this study to explore and trace teachers' learning experiences in naturalistic environments. The case study approach allows us to understand how teachers learn, the contradictions they face, and the scaffolds provided by knowledgeable others as teachers shift towards student-centred inquiry practices in this school. The value of the case study approach is to maximise learning from each case. It is not about generalisability to other cases because case study research is not sampling research. Each case is unique (Stake, 1995). The value of our case study is in showing the

nuances and uniqueness of situated teacher learning by describing key events, processes, and socio-cultural dimensions afforded by the community. Validity and reliability of findings is a concern in case study research. This is addressed by using multiple sources of evidences, such as interviews, field notes, and reflections, to develop convergent lines of inquiry (Yin, 2018).

Informants

Informants are purposively selected for in-depth exploration. Participants included the community involved in the teacher learning journey. The community comprised two teachers enacting the innovation in Science classrooms as well as two experienced teachers and two researchers who acted as knowledgeable others, within and beyond school, respectively. Enacting teachers, Christine and Adeline, have between one to three years of teaching experience. Experienced teachers, Serene and Tom, have spent more than five years teaching in the school. Researchers have experiences helping teachers in diverse schools implement school-based innovations that focus on student-centred inquiry learning in Science.

Data collection and analyses

While the innovation lasted for two years, the data collected and analysed described teachers' learning experiences in communities over one school term (10 weeks). Data sources included field notes, interviews, and observations of classrooms and community meetings. Written informed consents were obtained for data collection. Table 1 summarises how data contributed to the research question.

[Table 1 near here]

Interviews are the most important data source. Interviews provide access to multiple realities (Stake, 1995) and opportunities to reconcile discrepancies between what teachers say about the learning experience and their actions in reality (Gillham,

2000). Interviews also allow deep probing of contradictions that enacting teachers faced, and the roles and contributions of how knowledgeable others (experienced teachers and researchers) supported teacher learning. Participants were interviewed twice; at the beginning and end of the term. Interviews lasted between 60 to 90 minutes. Interviews were digitally recorded and transcribed. Member checking ensured credibility of transcriptions.

Observations and field notes were captured. Classroom observations documented teachers' innovative practices and contradictions. Observations of community meetings and enacting teachers' reflections with researchers captured the interactions, scaffolds, and adaptations made to ensure the innovation and teacher learning remained relevant for classrooms. The observations varied between 30 to 90 minutes. Observations were video recorded, and field notes were generated. Other field notes included reflections of data hunches, impressions, analyses and clarifications throughout the study. Table 2 provides the timeline and frequency of data collection for each data source.

[Table 2 near here]

Principles of process coding (Saldaña, 2016) and socio-cultural dimensions from our theoretical lens, [CHAT](#) (Engeström, 2001), guided data analyses. Process coding is useful for qualitative studies that focus on understanding actions that addressed a problem or goal (Saldaña, 2016). Process coding uses gerunds (that is, “ing” action words) to represent actions in the data (Charmaz, 2006). Process coding aligns with this study because it unpacks the actions, consequences, as well as the sub-processes such as the individual strategies and actions. Process coding derives rich descriptions where action words provide a sense of events, how actions evolve, and the shifts made to accomplish the problem or goal. In this study, process coding is guided by CHAT

(Engeström, 2001) to unpack the socio-cultural elements related to teacher learning (such as object, subject, tools, rules, and community), contradictions teachers experienced, and their evolving understandings of student-centred inquiry practices.

In line with process coding, data analyses involved macro and micro perspectives. Macro perspectives unpacked the process into key activities, which provided an overview of the learning process that teachers experienced in communities as they evolved their innovation and student-centred practices. For macro analyses, we conducted process coding by going through data that involved the community at a broader view, such as field notes from observations of community meetings and teachers' reflections to label key actions that happened over one school term. Coding of key actions using gerunds was guided by CHAT (Engeström, 2001) and these seven socio-cultural dimensions:

1. Division of labour: what did enacting teachers and knowledgeable others do in the teacher learning process?
2. Community: who made up the community?
3. Rules: what rules did enacting teachers and knowledgeable others follow?
4. Subjects: who were the subjects of the teacher learning process?
5. Tools: what tools did teachers use in the teacher learning process?
6. Object: what was the objective/goal of the teacher learning process?
7. Outcome: what were the consequences of the teacher learning process?

All similar actions were categorised together to highlight these three key activities in the teacher learning process: (1) progressing towards using students' artefacts to inform lessons, (2) recognising open-ended questions to build and guide students' learning, and (3) designing student-centred activities for exploring and building understandings.

At the micro level, process coding was repeated again and guided by the above seven socio-cultural dimensions of our theoretical lens. However, micro level analyses focused on unpacking the activity system for each key activity at a more nuanced level. Process coding at the micro level was applied to data sources that related to individual teachers, such as individual teachers' interview transcripts and field notes derived from observing the teacher's classroom. The micro perspective showed nuances of sub-processes within each activity by unpacking socio-cultural elements, such as how the communities made sense of contradictions faced, how knowledgeable others helped teachers address contradictions, and how teachers expanded their understandings of student-centred practices.

To remove bias and errors of findings, data analyses were subjected to cross-examination. Observations and field notes of classroom enactment and community meetings were triangulated and crosschecked against interviews with teachers.

Research Context

Tilly School recognised the value of teacher learning. The school used innovations as a context for teachers to inquire into issues and understand how to implement student-centred inquiry practices in Science classrooms. The principal set directions and provided resources for the community to meet and learn for two hours every week over a two-year period. Teachers were given autonomy to design the innovation and enact student-centred practices in ways that met students' needs and curriculum demands.

The school formed a community with knowledgeable others within and beyond the school to support teacher learning. The community included two enacting teachers, two experienced teachers, and two researchers. Teachers learnt by focusing on designing lessons. Contradictions and gaps arose as teachers experienced cyclic processes of designing, enacting and refining lesson designs. Knowledgeable others

within the school (experienced teachers, Tom and Serene) and those beyond the school, such as researchers, supported enacting teachers (Christine and Adeline) in addressing contradictions. As contradictions were tackled, Christine and Adeline developed their understandings of how to design and implement student-centred inquiry practices. Enacting teachers, Christine and Adeline, were also expected to become champions of student-centred inquiry practices after going through this learning journey.

In the subsequent section, we present descriptions to illustrate the three key activities (incidents) that teachers experienced when learning in communities. These activities highlight the processes that teachers experienced in 10 weeks of the teacher learning journey and how they addressed contradictions to expand their understandings of student-centred inquiry learning. Nuances in the key activities are described using CHAT (Engeström, 2001) to show how enacting teachers' reflections, knowledgeable others' scaffolds, and tools (such as students' artefacts and technological tools) mediated teacher learning.

Findings

Progressing towards using students' artefacts to inform lesson designs

Surfacing readiness for student-centred practices through teacher reflections

Teachers in Tilly School faced difficulties as *subjects* of this learning journey. Although the *outcome* was to design and implement student-centred inquiry in classrooms, teachers faced contradictions. The *contradictions* arose because teachers still valued *rules* related to teacher-centred, efficiency practices. Teachers designed many activities with expectations that students should derive correct answers quickly. These activities did not emphasise inquiry. Excerpt 1 below showed how Adeline perceived teachers' role as affirming and summarising correct answers rather than understanding students' thinking.

[Excerpt 1]

Adeline: I feel that it is always good to converge, right? So, every time when they do the class activity, I will come back and say one point (the correct answer) from every group (...) I think it is good, at least they know what other groups are doing.

Teachers thought that they had designed lessons using *rules* of student-centred inquiry, but the classroom culture and practices remained teacher-directed. Teachers needed to leverage students as active participants. Teachers needed to give students time to construct artefacts and voiced their thinking as *tools* to inform lesson designs.

Teachers became discouraged during community meetings. They realised that students' responses were not better than the past when they used teacher-directed approach (see Excerpt 2 below). Teachers' *goal (object)* was to design learning activities that focused on students' thinking. However, *contradictions* arose because teachers and students were not ready for inquiry practices.

[Excerpt 2]

Christine: After all the activities (that we have designed), the students don't seem to grasp the concept (of what a living thing is). One of them (students) asked if cloud is a living thing. Can I go and do some frontal teaching to correct them? I feel that I cannot let them continue with this misconception.

Use students' responses to create informed possibilities for inquiry

Researchers in the community *contributed* to addressing the problem (*contradiction*). Researchers helped Christine and Adeline identified gaps. Researchers suggested that teachers elicited students' misconceptions and thinking processes rather than focused on outcomes. Excerpt 3 showed researchers' scaffolding efforts by highlighting possibilities of how teachers could develop lesson designs based on students' thinking.

[Excerpt 3]

Researcher: Why don't you listen in on students' discussions? We can find out from them why they are making those statements, questions and misconceptions. Let's look for evidences in the next lesson so that we know why and think of ways to address those issues...

Experienced teachers also *contributed* by providing scaffolds to tackle the problem (*contradiction*). Experienced teacher, Serene (see Excerpt 4 below), gave contextualised insights that highlighted possibilities of student-centred learning based on her understandings of the school.

[Excerpt 4]

Serene: You (Christine and Adeline) should be happy that students are asking questions! Last time (teacher-directed practices), students had misconceptions, but they could not articulate it.

Tom, another experienced teacher, supported Christine by focusing on students' understanding and perspectives. He put himself in students' positions to help Christine understand students' thinking (see Excerpt 5).

[Excerpt 5]

Tom: As I see you teach (in class), it is difficult from (students' point of) observation, because one of them (pictures) I don't see that there are tiny roots, it's just one whole thing, and it doesn't look like a root at all. So by observation (for students) to say that it's a root, it's challenging.

Figure 2 shows the activity system for the above incident of teacher learning.

Teachers in Tilly School were subjects. Teachers' outcome was to design and implement student-centred inquiry practices in classrooms. In terms of rules, they had the autonomy to design student-centred inquiry lessons that met students' needs. Enacting teachers faced contradictions because they still embraced teacher-centred mindsets. They needed tools, such as students' artefacts and thinking or misconceptions,

to inform lesson designs. The community included enacting teachers, experienced teachers, and researchers who contributed differently to address contradictions. Enacting teachers surfaced issues in classrooms. Researchers identified possibilities to elicit students' thinking and misconceptions. Experienced teachers contextualised issues and adapted possibilities to suit school's socio-cultural context. Individual and social interactions from this teacher learning incident helped teachers identified struggles (contradictions) and expanded teacher understandings that inquiry lessons were different from teacher-directed lessons. The community helped teachers to achieve the objective of eliciting students' artefacts and thinking as evidences to inform lesson designs.

[insert Figure 2 here]

Recognising open-ended questions to build and guide students' learning

Building rapport by talking to students and understanding their views

Teachers' evolving understandings of student-centred inquiry practices helped them to realise the importance of understanding students' existing knowledge to enrich students' understandings. Christine and Adeline acknowledged that the next *objective* of teacher inquiry was to use *open-ended questions as tools* to build rapport and understand students' thinking. This could add value to teachers' classrooms decisions and how they designed lessons. However, Excerpt 6 showed that Christine and Adeline faced a *contradiction*. They were more accustomed to asking close-ended questions that evaluated students' answers rather than thinking processes.

[Excerpt 6]

Adeline: Content-wise (questions) okay, when it comes to (open-ended) questions, I am not sure how to close the bridge...right now my questions can be very (too) open-ended...students don't really answer the question directly...Not sure how to close the gap...maybe a mix of close and open-ended questions.

Christine and Adeline leveraged the community's help to make sense of how to construct open-ended questions that guided students' learning. Researchers *contributed* to this sense-making by brainstorming possible strategies with teachers (see Excerpt 7).

[Excerpt 7]

Researcher: I don't know whether it helps; what I would do is to ask the children what they think when they say something. Although you want to summarise ideas (by looking at students' artefacts on the screen)...but it doesn't tell you what they think. When you talk to students, you will form ideas (of their thinking and misconceptions). So, you can make use of the ideas from the conversation to facilitate the class.

Christine and Adeline: Yeah...maybe we can try that.

Leverage insights of students' possible misconceptions and form constructive questions

Experienced teachers also contributed their insights from teaching students in Tilly School. They anticipated students' misconceptions. These insights became *tools* to help Christine and Adeline construct open-ended questions that scaffolded students' understandings. Christine and Adeline also faced another *contradiction*. They could not remember the open-ended questions and when to ask students at opportune times. The community suggested Christine and Adeline solved this contradiction by using presentation slides as *tools* to help teachers remember these open-ended questions and achieved their objective. Excerpt 8 shows Christine's post-observation reflection after she took the community's advice and addressed the contradiction. Experienced teacher, Tom, also encouraged her good effort. He facilitated teacher learning by adapting and

ensuring that the strategies suggested were aligned to students' needs and teachers' readiness.

[Excerpt 8]

Christine: I think it is good that I include the questions on the PowerPoint. For the pupils, the questions are always there. For the teachers, I think it is a great help because I cannot remember all the questions, and I have to repeat all the questions so many times, so I cannot... (remember without including it in the slides)

(...)

Tom: It's good that you show PowerPoint with the instructions, so it's easier for them (students), if verbal instructions, they (students) won't be able to catch up.

Figure 3 unpacks the activity system for teachers' evolving understandings of student-centred inquiry practices. Teachers as subjects and their community, rules and outcome remained unchanged when compared to the earlier activity system where teachers recognised the value of student artefacts. Here, the teachers' object (goal) is to use open-ended questions to guide students' understandings. Teachers faced contradictions because they were more comfortable asking close-ended questions. They tended to forget to ask open-ended questions. To address these contradictions, the community engaged in social interactions. Researchers and experienced teachers contributed differently to teachers' sense making. Researchers brainstormed open-ended questions while experienced teachers adapted these questions according to teachers' and students' readiness. These open-ended questions and PowerPoint slides became tools that helped teachers achieved their goal.

[insert Figure 3 here]

Designing student-centred activities for exploration and building understandings

Building on the previous activity, Christine and Adeline used open-ended questions as *tools* to understand students' thinking. Teachers surfaced students' diverse misconceptions but also experienced contradictions. Excerpt 9 shows that teachers faced *contradictions* because they were unsure of how to steer students' misconceptions to the correct understandings.

[Excerpt 9]

Adeline: There was one group... they (students) took the photo of the radish upside down...they labelled the whole thing upside down.

Researcher: They labelled the root as stem.

Christine: My students also did that. Should I tell them to retake the pictures and label again? I don't know how to address that.

Tom: They (students) observed things based on space and position rather than observe the leaves and shape. (...)

Christine and Adeline noted in the excerpt below that they faced *contradictions* because they were more accustomed to designing activities that limited students' explorations. Their old activities directly exposed students to the correct answers in controlled environments. Now, they understood that the goal (*object*) of student-centred inquiry practices was to design student-centred activities as *tools* for students to explore misconceptions and developed personal understandings.

[Excerpt 10]

Adeline: Last time, I just looked at the textbook and the lesson plans provided by CPDD (Curriculum Planning & Development, Ministry of Education), and I just used it without thinking critically. (...) [Now,] there are a lot more discussions in the class where the students present. (...) different ways of answering, questioning, from there, slowly, I became a bit more aware.

Actually, students have the right to think their own and come out with the answers (on) their own.”

Researchers and experienced teachers *contributed efforts* to address the contradiction. They helped Christine and Adeline grouped students’ misconceptions and brainstormed activities that exposed students to multiple occurrences of the concept in real-life situations (see Excerpt 11).

[Excerpt 11]

Christine: Maybe students really need to see the real plant in the real original place not plants (radish) in nicely packed packing.

Researcher: [It reminded me of] Sally’s class (one teacher’s lower ability class). We buried everything (radishes) for them. So, most of them know it’s a root because it’s buried underground.

Christine: They (students) must have this experience to take out, then take a picture (...)
[For example], at home, whatever vegetable they eat is on plate...they cannot see the whole sequence, they see it only in parts.

Tom: Maybe their connection level is not that high...they lack these experiences and exposure.

Figure 4 shows the teacher learning activity. Teacher as subjects navigated the rules of autonomy and designed innovations for student-centred inquiry practices. The community and division of labour enabled teachers to achieve the object of using student-centred activities to build students’ understandings. Researchers and knowledgeable others addressed contradictions by organising misconceptions and brainstorming activities that exposed students to concepts in different scenarios. Open-ended questions became tools that enabled the community to understand misconceptions and construct appropriate activities. Through this teacher learning

experience, teachers appreciated student-centred activities as tools to get students to explore concepts and address their own misconceptions. Teachers experienced expansive learning opportunities. Student-centred learning was not about teacher-directed activities that showed passive students what the correct concepts were.

[insert Figure 4 here]

Discussion

For Singapore, every school, a good school; every student, an engaged learner; and every teacher, a caring teacher are all dreams of TSLN and TLLM (Ng, 2017).

Achieving these dreams may require a socio-cultural paradigm of professional learning where teachers develop capacities to drive innovations. [Our findings illustrate how a school-navigated policy mandates and engages in situated teacher learning in communities where teachers inquired about their practice and implemented student-centred practices.](#)

Using **CHAT** (Engeström, 2001) as a theoretical lens, this study unpacks teacher learning as confluences of socio-cultural dimensions at the macro and micro levels. In the following paragraphs, the *macro level* discusses findings to show the collective socio-cultural elements in the entire situated teacher learning process that involves real issues and communities. At the *micro level*, findings discuss each event within the situated teacher learning process, understand the contradictions teachers faced, decisions made, as well as the individual and social interactions that led to teachers' expansive understandings of student-centred practices for their contexts.

Teacher learning as a macro activity and its socio-cultural elements

Findings show that teachers are subjects in the teacher learning process. Innovations are tools that mediate the situated teacher learning journey. Teachers engage in collective inquiry by designing, enacting, and refining lessons for their contexts. The community

in our study includes members within and beyond schools to support teacher learning. The community works collaboratively to derive a shared objective and outcome. The shared objective involves teachers implementing student-centred practices for their classrooms and achieving these outcomes: (1) students learning in inquiry ways, and (2) teachers becoming designers of innovations and student-centred practices.

Research shows limited understandings of how teachers engage in the situated teacher learning process (Yendol-Hoppey & Dana, 2010; Hamilton, 2004). Our study addresses this gap by illustrating how teacher learning, situated in innovations, involves a confluence of socio-cultural aspects. [Findings show that situated teacher learning in communities is closely tied to practice and arises from real necessities.](#) Situated teacher learning bears different qualities. It is authentic and contextualised, shaped by physical, social, and practice contexts.

Findings show that situated teacher learning differs from the traditional, cognitive paradigm to emphasise that professional knowledge is developed by inquiring about practice. Teacher learning goes beyond listening about new ideas to actual implementation of the substance, process, and organisational supports for new practices (Davis et al., 2000; Eisner, 2002; Lieberman, 1995). Teaching is relational work.

[Findings show how teacher capacity building is a community-based endeavour.](#)

Teachers learn and navigate the complexities of professional learning by collaborating in communities to address [contradictions](#), share ideas, and engage in collective decision-making. [Consequently, teachers expand their understandings of how student-centred inquiry practices can be aligned with local, school needs and policy mandates.](#)

Literature (such as Vangrieken et al., 2017; Vescio et al., 2008) shows that physical and community conditions influence teacher learning. [Our findings show how these conditions are contextually nuanced and result from intertwining socio-cultural](#)

factors that involve communities, schools, and education contexts. Rules afforded by school and education contexts have bearings on how teachers learn. Findings highlight that, *at the policy level*, the Singapore education context emphasises a centralised-decentralisation stance. *In school*, teachers are empowered to design student-centred practices that meet TSLN's mandates. Teacher communities have the autonomy and resources to design innovations and refine lesson plans based on students' learning and needs. *Within the community*, there is division of labour and dualities between enacting teachers and knowledgeable others who provide socio-cultural supports for teacher inquiry.

Findings illustrate that knowledgeable others, within and beyond the school, complements teacher learning. Communities which only include knowledgeable others within schools may lead to groupthink and constraint teacher learning (Wenger, 2010). Our findings show how researchers, who are knowledgeable others beyond the school, guide teachers' deep reflections by focusing on students' responses and artefacts as evidences to inform and refine lessons (see Excerpt 3). Researchers may use their diverse experiences of helping other schools to offer multiple possibilities (see Excerpt 11). These possibilities build on positive classroom incidents to facilitate teachers' lesson designs.

Findings also illustrate how experienced teachers within the school complement researchers as knowledgeable others by expanding fields of knowledge and diversity of ideas to social contexts beyond schools. A community within and beyond schools creates collaborations and opportunities for intellectual stimulus and emotional support that develop teachers' professional growth (Lieberman & McLaughlin, 1992). In our study, experienced teachers worked with researchers to contextualise possibilities based on their insights of school's context and students (see Excerpt 4). Experienced teachers

encouraged colleagues by making explicit the worthy achievements that enacting teachers made (see Excerpt 8). Experienced teachers also helped in adapting and ensuring that the pedagogical innovation met students' needs and teachers' readiness.

Teachers learning is a composite of micro activities with different socio-cultural elements

Findings show that there are no definitive roadmaps in the situated teacher learning process. It is based on contradictions that teachers faced and support from knowledgeable others that guided teacher learning. **Our study shows that the teacher learning process is made of three key events.** Each event showed contradictions that arose from school contexts. Support created through interactions between individual teachers and community enabled contradictions to be negotiated, objectives to be achieved, and new knowledge to be constructed about student-centred inquiry practices. Consequently, expansive learning opportunities are created. The teacher learning process is contextualised to school needs and knowledge created becomes an integral part of the school (Lieberman, 1995).

In the first incident, teachers faced contradictions because they still embraced teacher-centred practices. Through interactions with the community, knowledgeable others (experienced teachers) provided insights of students' readiness for inquiry practices based on past experiences in the school. Knowledgeable others scaffolded teachers to achieve the goal where teachers realised that students' artefacts and thinking can be mediating tools to inform student-centred lesson designs. The rule is that teachers do not design lessons to tell students the correct answers but to address students' misconceptions and thinking.

The second incident relates to how teachers recognised that they lacked capacities to ask open-ended questions that surfaced students' misconceptions and

guided learning. The contradictions arose because teachers were more familiar with asking close-ended questions that evaluated answers rather than using open-ended questions to develop students' understandings. The individual and social interactions in the community provided socio-cultural supports, so teachers realised that using open-ended questions as tools required them to build rapport with students, understand students' needs, and facilitate knowledge building. Knowledgeable others worked with teachers to design strategies for open-ended questions and used slides to help teachers remember those questions. Experienced teachers leveraged experiences teaching students in the school to help teachers design constructive, open-ended questions.

Finally, contradictions in the third incident related to how open-ended questions surfaced many misconceptions. Teachers did not know how to address misconceptions without telling students the answers directly. Knowledgeable others helped teachers grouped students' misconceptions to design student-centred activities that allowed explorations in real-world contexts and enabled knowledge construction.

These incidents showed nuances of situated teacher learning by illustrating how interactions within the community resolved contradictions to achieve sub-objectives. These sub-objectives collectively built up to the overall goal (object) where teachers developed capacities to enact student-centred inquiry practices for their classrooms. These incidents addressed the research question to provide a contextualised view of teacher learning that showed how socio-cultural elements occurred differently as teachers tackled contradictions and sought synergies between school and policy contexts for student-centred practices. Each incident addressed a sub-objective and provided new insights. Each insight built on the previous one so that teachers developed contextualised understandings. This iterative process of recognising and addressing

contradictions facilitated expansive learning and enabled teachers to have rich understandings of student-centred inquiry practices for their classrooms.

While situated teacher learning is useful for inquiring and reflecting about practice, the ways teachers learn is uncertain because contextual, individual, and social factors can influence it (Hamilton, 2004; Leinhardt, 1988; Timperley, 2008). This study addresses gaps by systematically describing the situated teacher learning process to unpack the macro process and micro incidents that develop teachers' student-centred practices. Each incident is similar and different at the same time. The subjects, rules, community, division of labour seem to align with the macro, teacher learning process but the tools and objectives for each incident may differ to show continuity and evolving understandings from the previous incident. This shows an interplay of how incidents contribute to the whole to make up teachers' learning journey. The confluence of socio-cultural elements, particularly the individual and collective interactions, varies to address contradictions in each incident. [Our findings illustrate the complexity and confluence of socio-cultural elements as teachers sought synergies and evolved their capacities of student-centred inquiry practices.](#)

Conclusion

Teacher learning is key for quality teaching and learning. Education systems, build teachers' capacities to promote policies and champion innovations. Yet, situated teacher learning is a black box (Timperley, 2008) because how teachers learn is influenced by different socio-cultural factors. This paper describes how teachers engage in situated teacher learning within a community by designing innovations and enacting student-centred inquiry practices against the backdrop and demands of TSLN.

CHAT (Engeström, 2001) was employed as a theoretical lens to understand the confluence of socio-cultural context and conditions that shaped teacher learning. Findings described at a micro, incidents level show the contradictions teachers faced, communities' contributions, and tools used to evolve teachers' capacities for student-centred practices in classrooms. Collectively, these incidents provided insights of the interweaving socio-cultural supports in the form of rules, community, division of labour, and tools that teachers leveraged to achieve sub-goals and alignments between TSLN's mandates and school's needs. Members of the community including knowledgeable others within and beyond schools provided diversity of ideas to tackle contradictions, collaborate and expanded teachers' understandings of student-centred practices.

Findings contribute to policy and practice by showing how situated teacher learning enables teachers to engage in reflective inquiry and a generative process of unpacking what student-centred practices mean for their contexts. Situated teacher learning is a collective endeavour because teaching is relational work involving students, teachers, schools, and the educational landscape. Enacting student-centred practices in classrooms require the teacher community to experience collective inquiry, navigate the interweaving demands of school and policy contexts, as well as create socio-cultural supports to address challenges.

Findings in this study only unpack key incidents of the situated teacher learning process over a 10-week period. Findings illustrate how socio-cultural conditions shape teachers' evolving understandings of student-centred inquiry practices. This study provides opportunities for future work where CHAT (Engeström, 2001) can be used as

lens to systematically unpack confluences of socio-cultural conditions for teacher learning at the macro and micro activity levels over a longer period of time.

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