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Abstract

As transfers of educational ideas across countries accelerate in the 21st century with globalization, studies on educational change have lagged in foregrounding the importance of cross-national contexts when ideas traverse borders. This qualitative study investigates 30 Singapore teachers' perceptions of challenges involved in implementing differentiated instruction from the U.S., to sketch the contours around the intersection of educational transfer and change. Through analyzing classroom discussions and assignments of teachers enrolled in a Masters-level differentiated instruction course, we found that teachers' perceptions of implementation challenges clustered around technological, sociocultural, and political concerns. Challenges associated with differing technological conditions (e.g., class size/space and teacher capacity) and sociocultural norms (e.g., emphasis on control, results, and teacher-centered teaching) bring to fore how perceptions of origin and destination contexts shape reception of educational ideas, like differentiated instruction. Postmodern ambiguities around norms, objectivity, and evidence in a globally porous world further complicate teachers' concerns. In concluding, we propose a comparative educational change framework through which educational change and transfer can be viewed and argue for the need to scrutinize the influence of cross-national contexts when studying educational change across borders.

Keywords: educational change, educational transfer, comparative and international education, theoretical framework, differentiated instruction, Singapore

Introduction

Educational transfer—"the movement of ideas, institutions, or practices across international borders" (Beech, 2006, p. 2)—has seen increasing popularity in an age of globalization as countries look to alternative ways of boosting educational achievement, student engagement, as well as enhance professional learning. However, educational transfer, as with any educational change, is a complex endeavor that requires institutions, educators, students, and other stakeholders to participate in the change process. Vavrus and Bartlett (2012) cautioned that cultural, political, and socioeconomic influences of origin and destination contexts complicate the transfer of education ideas even though these ideas are often construed as a "globalized form of knowledge and a source of 'best practices'" (p. 636). Likewise, scholars have critiqued educational change conversations for assuming universality and being acontextual (Garcia-Huidobro, Nannemann, Bacon, & Thompson, 2017). When educational transfer intersects educational change, differing origin and destination contexts, together with the already multifarious endeavor of educational change (Fullan, 2007; Fink & Stoll, 2005), pose an added layer of complexity to the transfer process. Such complexities and the role of contexts are rarely explored. This article aims to sketch the contours around the intersection of educational transfer and change as well to illuminate the criticality of contexts. We seek to answer the research question: What are teachers' perceptions of the challenges involved in transferring and embarking on differentiated instruction (DI) in the Singapore context? In studying Singapore teachers' perceptions of the challenges involved in embarking on implementing DI, an educational approach borrowed from the U.S., we hope to contribute to a more nuanced understanding of the educational transfer and change process.

Review of Literature

We reviewed literature on educational change within and across national contexts, teachers' perceptions of educational change and transfer, as well as existing frameworks in comparative education to help us understand how these concepts interact in existing research.

Educational Change within National Contexts

Scholars analyzing articles published in the *Journal of Educational Change* over the past 14 years observed that educational change literature in the early 21st century tended to be acontextual and assumed universality of relevance in findings and theories as educational change ideas travel within a country (Garcia-Huidobro et al., 2017). However, the traveling of educational change ideas across schools is fraught with challenges (Fink & Stoll, 2005; Fullan, 2007; Hargreaves, Earl, Moore & Manning, 2002). To illustrate, local contexts—be it in the form of organizational constraints, student diversity, instructional expectations, or teacher beliefs— pose difficulties when school reform was implemented across 13 schools in the U.S. (Datnow, 2002) and also when literacy-reform ideas travelled from New York to San Diego (Mehan, Hubbard & Stein, 2005).

Studies highlighting the complexity of educational change within national contexts omit the complications of educational transfers across national contexts. Yet, these educational transfers are a force to be reckoned with given its acceleration in the 21st century. Globalization and technological revolutions in the digital and transport world have intensified the movement of people and ideas across space. Global institutions, like the World Bank, inevitably endorse a global educational agenda by imposing ideas around how schools are being run from the global North to the South (Anderson-Levitt, 2003). World system theorists argue that these global institutions indirectly privilege student-centered pedagogies and dispositions, like decision-

making and independence, that are premised on neo-liberal economic agendas (Carter, 2010). International testing, like Program for International Student Assessment (PISA), also shape education policy makers' agenda to look abroad and borrow ideas from "reference societies" (Deng & Gopinathan, 2016, p. 449) like Finland that are typically construed as high-achieving. Amidst this background, educational transfers are unavoidably complicated by cross-national differences in culture, histories, educational traditions and organizations, and structures (Alexander, 2001).

Educational Transfer Across National Contexts

Traditionally, studies of educational transfers have been situated within the field of comparative and international education given its focus on examining education systems across countries (Beech, 2006; Steiner-Khamsi, 2012). The goal of educational transfers involve adopting ideas, institutions or practices from an origin to a destination country, with a goal of improving educational conditions or achievements in the latter. Thus, educational transfer and educational change are entwined. In recent years, a body of scholarship has developed around educational transfers that are as specific as lesson study (Lim-Ratnam et al., 2019; Rappleye & Komatsu, 2017) and Singapore Math (Naroth & Luneta, 2015; van Zanten & van den Heuvel-Panhuizen, 2018) to the more generic, like student-centered pedagogy (Sriprakash, 2009; Vavrus & Bartlett, 2012).

In studying the implementation of a student-centered project—"Joyful Learning"— sponsored by UNICEF, Sriprakash (2009) found that cultural beliefs surrounding hierarchical teacher-student relationships and social stratification (e.g. the caste system), challenged Indian teachers' appreciation of their students and understanding of the nature of knowledge-making. Similarly, Vavrus and Bartlett (2012) found that the inclusion of student-centered and

constructivist approaches in teacher education and policies in Tanzania was profoundly constrained by the cultural (e.g. teacher holds epistemic and classroom authority), political (e.g. government officials'/funders' expectations), and socioeconomic conditions (e.g., lack of teaching materials and professional development funding) of the schools and country.

Educational transfer studies tend to be situated within the comparative and international education field as it pays close attention to the importance of the national context, like culture, institutions, histories, or politics. Educational change studies, on the other hand, continue to be critiqued as being acontextual (Garcia-Huidobro et al., 2017), despite the ubiquity of educational transfers in the 21st century. This begets the question of how the educational change field can benefit from comparative and international education perspectives. Further, work on educational change in the Anglosphere continues to overshadow those situated in Asia and the Global South (Garcia-Huidobro et al., 2017). Thus, this article adds to literature situated outside the Anglosphere by studying teachers' perceptions of the challenges they expect with introducing DI in Singapore.

Teachers' Perceptions of Educational Change and Transfer

This study focuses on teachers' perceptions of challenges prior to implementation as scholars emphasize the power of beliefs on practice: Fullan (2007) argued that for educational change to succeed, on top of addressing materials (e.g. new/revised curriculum resources) and behavior (e.g. teaching approaches), we need to alter beliefs and/or assumptions. Even though some teachers adopt new curriculum materials or approaches, their implementation may remain shallow as deep-seated beliefs remain unchanged. He argued that real change requires change in "conceptions and role behavior" (Fullan, 2007, p. 40). Likewise, Pajares (1992) asserted that one's beliefs or perceptions predispose one to action, since the extreme complexity and

immediacy of responses central to teachers' work causes them to rely on their beliefs rather than cognitive knowledge.

Against the background of educational transfer, teachers' perceptions need to be interrogated vis-à-vis destination and local contexts. For instance, Sriprakash (2009) observed that Indian teachers perceived collaborative learning as a classroom management strategy for organizing instruction, rather than democratic empowerment of children, because cultural assumptions around teaching as top-down, as well as structural constraints, like inadequate resources and large class size, shaped their perceptions. Likewise, American teachers' perceived Lesson Study (from Japan) as a teacher development strategy that helped them get to an end (a perfect lesson), rather than a "process of continual improvement without end" (Rappleye & Komatsu, 2017, p. 407) because, coming from a different context, they were less appreciative of reflectivity and openness to criticism and growth, values that are deeply embedded within the Japanese society.

These perceptions, other than being shaped by local exigencies, can also arise from the lack of immersion in the origin educational context. Perceptions of educational ideas are influenced by print and digital media that teachers consume beyond traditional professional learning avenues. "Folk" (Liu & Dervin, 2017) comparative discourses of education, channeled through books for public consumption after authors' visits or experiences of overseas schools, fuel the public imagination of an educational ideal that may or may not reflect reality. Therefore, paying attention to teachers' perceptions of challenges is critical because the educational change process itself is fraught with barriers, and cross-national perceptions of challenges can pose additional hindrance to implementation. Understanding the challenges teachers perceive is thus as necessary as paying attention to local exigencies for successful educational change.

Comparative Educational Change Framework

To this end, we draw upon concepts on educational change and comparative pedagogy to propose a nascent "comparative educational change framework" that shapes how we approach our study. On educational change, House and McQuillan (1998) cautioned against taking a simplistic interpretative framework. They argued that for successful change and innovation to take place in schools, one needs to consider three perspectives—technological, political and cultural. The technological perspective focuses on production (e.g., process, technique and efficiency), while the political and cultural perspectives focus on negotiation (e.g., conflict and compromise, persuasion and inducement, power and authority) and community (e.g., interaction, meaning and values, context) respectively. They found that the success of educational change initiatives in New York City, Green Valley and Dubuque, were a result of reformers addressing these three perspectives concurrently. By enhancing collaboration across staff and collective responsibility of accountability, re-culturing staff's beliefs of teaching and learning through professional development (culture), involving parents, faculty, and students in the negotiations of proposed reforms (political), and routinizing professional development in teachers' lives (technological), educational change was achieved.

Hargreaves et al. (2002) offered an extension to House and McQuillan's three perspectives by adding a postmodern perspective. They argued that the world we live in is "complex, diverse, and uncertain", where both students and teachers are no longer "knowable or predictable" (Hargreaves et al., p. 58) given the constancy of change. This addition is especially relevant in a globalized world and when we consider transferring educational changes across national borders. In studying how teachers in Ontario, Canada, handled educational reform in common learning outcomes, curriculum integration, detracking, and greater performance-based

assessment, Hargreaves et al. found that teachers' ability to implement change depends on how five areas—school structures, teacher culture, professional learning, professional discretion, and school leadership—interacted with technological, political, cultural, and postmodern issues. Technologically, teachers had concerns about mastering a new curriculum and its requisite teaching strategies, and felt that professional learning (through one-on-one coaching, observation, and training) and school structures (like block timetabling) were essential. Their concerns pertain to issues of process, techniques, and organization. Culturally, Ontarian teachers felt that participating in sense-making collaboratively with other colleagues was necessary as "changing beliefs and practices is extremely hard work" (p. 118). Politically, teachers who embraced change most effectively were those where school leaders offered intellectual, emotional, and strategic leadership, and where negotiations between teachers and leaders were premised on mutual trust. In a postmodern world, teachers often had to traverse policies that were contradictory—for instance, they saw integration across subjects and emphasizing skill outcomes in conflict with standardized assessment, as with new student-centered emphasis in contradiction with previous teacher-centered practices—indicating the chaotic, uncertain, and complex nature of educational change.

House and McQuillan (1998) and Hargreaves et al.'s (2002) perspectives were derived from studying change within a single national context—the U.S.A. and Canada. Relatedly, the perspective of "culture" concerns school culture with less attention paid to other types of cultures, for instance, societal or ethnic culture. Consequently, we turn to the work of comparative and international education scholars like Alexander (2001), Sriprakash (2009), and Vavrus and Bartlett (2012) to supplement cross-national insights on educational change. Particularly instructive is Alexander's "comparative pedagogy." He argued that pedagogy

concerns students, learning and teaching, and is deeply rooted in the ideas, values and beliefs of educators, that are in turn altered by context, policy and culture. Culture, in this case, refers to ways of thinking and being in the school, local, and national setting that are influenced by geography, history, and technology (amongst others). Thus, comparative pedagogy is "pedagogy shaped by national culture and history, and by the migration of ideas and practices across national borders, as well as by more immediate practical exigencies and constraints such as policy and resources" (Alexander, 2001, p. 5). The understanding of an education system is situated within historical, societal, cultural, and contextual forces (as previously illustrated by Sriprakash (2009), Rappleye and Kotmatsu (2017), as well as Vavrus and Bartlett (2012)). Comparative pedagogy thus necessitates a study of interactions between past and present, local and global, and origin and destination contexts.

We overlay the four perspectives of House and McQuillan (1998) and Hargreaves et al.'s (2002) theories on educational change—technological, political, cultural, and postmodern—with Alexander's (2009) comparative pedagogy, to forefront how historical, societal, cultural, and contextual forces between origin and destination contexts interact with destination (Singapore) teachers' perceptions and hence receptivity of new educational ideas like DI from abroad. In proposing the comparative educational change framework, we hope to contemplate the influence of the destination, vis-à-vis the origin context, on Singapore teachers' perceptions of DI in these four perspectives.

Educational Transfer in Focus: Differentiated Instruction in Singapore

The Singapore education system has gained prominence in recent years for its exceptional achievements on international assessments (e.g., TIMMS and PISA) (Gopinathan & Deng, 2016; Hogan et al, 2013). Its success has been attributed to several reasons including,

amongst others, such as high teacher quality (teachers are centrally recruited from the top 30% of graduates), coordinated teacher professional development support (all teachers are educated at the sole teachers college, National Institute of Education), and high governmental investment in education (Low & Tan, 2017; MOE, 2018). Constrained by natural resources, Singapore has historically adopted a pragmatic or functionalistic approach to education, leveraging it as workforce preparation for the economy. (Tan & Ng, 2007; Tan, Tan & Chua, 2008). Additionally, against the prevailing ideology of meritocracy and equality, education is highly-valued by the society and seen as a viable route to social mobility. Regardless of its exceptional achievements, Singapore's education system faces tensions. Despite policy initiatives—like "Teach Less, Learn More" (2004)—that encourage a more student-centered, inquiry-oriented, and hands-on experience, scholars observed that instructional strategies continue to be didactic/teacher-centered and performative/results-oriented, with a strong focus on knowledge transmission and regurgitation at assessments (Hogan et al, 2013; Hogan & Gopinathan, 2008; Liang & Dixon, 2011; Tan, Tan & Chua, 1997). Further, scholars noted the heavy workload and busyness experienced by Singapore teachers, as their work extends beyond teaching and includes administrative responsibilities, meetings, committee work and discussions with parents and students outside curriculum hours (Goodwin, Low, & Ng, 2015; Ng, 2015).

Introduction of Differentiated Instruction in Singapore

A small island state with a population of 5.6 million people in 2018, Singapore's resident population is categorized into four racial groups: Chinese (74%), Malay, (13%), Indian (9%), and other ethnic groups (3%) (Department of Statistics Singapore, 2018). Between 2005 and 2018, the Singapore population saw a 10.4% point increase in its non-resident population to 29.1% of the total population (Department of Statistics Singapore, 2016). Between 2005 and

2015, the proportion of dual-income, lone-parent and English-speaking households increased. This prompted the Ministry of Education (MOE) to acknowledge the "diverse abilities and interests of our students" (MOE, 2005c), particularly the widening proficiency in Mother Tongue languages, and need for DI to help teachers and students cope (MOE, 2005a, 2005b, 2005c, 2009, 2013).

Concurrently, the MOE's recommendations for DI are motivated by policy changes around tracking. At present, after six years of compulsory primary school education, students are tracked into one of three tracks—Express/Integrated Program, Normal (Academic), or Normal (Technical)—based on scores attained on the national high-stakes, standardized Primary School Leaving Examination (PSLE) (MOE, 2018). By 2024, these tracks will be removed to allow students to pursue different subjects at a level suited to their ability (MOE, 2019). In light of more heterogeneous classrooms, DI has been adopted by the MOE as an educational approach that could support growing diversity in Singapore schools. Professional development workshops and courses on DI have been conducted by both MOE as well as the National Institute of Education, and curricular materials with ideas for differentiation have been distributed to support teachers. The approach most frequently referenced by the Singapore MOE derives from University of Virginia's scholar, Carol Ann Tomlinson. Tomlinson (2001) defines DI as a systematic approach where teachers modify curricula, teaching and learning pace, routines, methods, resources and activities to honor and address the broad range of students' readiness levels, needs, interests, motivations and learning styles to maximize their learning opportunity and capacity. Underpinning the approach is a student-centered and equity-based philosophy that regards diversity as normal and valuable in a safe, supportive, and intellectually-rigorous environment (Tomlinson, 2001; Tomlinson & Moon, 2013). Teachers approach teaching and

learning with a growth mindset and accept responsibility for maximizing each student's progress by removing barriers to equity (Tomlinson & Moon, 2013).

Studies on Differentiated Instruction

While the notion of differentiating instruction is not new, Tomlinson popularized and systematized this educational approach in the U.S. mainstream, mixed-ability classrooms in the 1990s. Since then, DI has gained popularity in countries worldwide for its purported promise of addressing student diversity. Other than in the U.S. (Brighton et al., 2005; VanTassel-Baska et al., 2008b), studies have been conducted in Australia (Mills et al., 2014), Israel (Wertheim & Leyser, 2002), Europe (Ritzema, Deunk, & Bosker, 2016; Strogilos et al. 2017; Van de Grift, 2007), and Asia (Chien, 2012; Shayshon, Gal, Tesler & Ko, 2014; Wu, Wan & Wong, 2015), an indication of the extent of its transfer. Most of these studies, however, tended to revolve around efficacy (Brighton et al., 2005; Chien, 2012; VanTassel-Baska et al., 2008b; Wertheim & Leyser, 2002) and implementation (Brighton et al., 2005; Chien, 2012; Mills et al., 2014; Ritzema et al., 2016; Strogilos et al., 2017, VanTassel-Baska et al., 2008b). Studies in and beyond the U.S. established that DI demands, amongst others, complex teaching skills, firm grasp of curricular content and assessment literacy, positive teacher-student relationship, as well as a variety of implementation challenges (Brighton et al., 2005; Chien, 2012; Mills et al. 2014; Van de Grift, 2007).

Yet, few studies analyze the impact of cross-cultural/national contextual differences. Shayshon et al. (2014) and Wu et al.'s (2015) studies reveal that understanding of differentiation is localized. Comparing Israeli, American, and South Korean teachers' perceptions of differentiation for the gifted and talented, Shayshon et al. found that less than half of the Korean teachers studied thought it important to consider the needs of high achieving students, compared

to 80% and 90% of Israeli and American teachers studied, respectively. They attributed it to differing school contexts, where many South Korean students attend private after-school programs for acceleration or enrichment, as well as the omission of DI in teacher training programs. Wu et al. found that Hong Kong teachers who used teacher-centered approaches when differentiating were under external pressure to produce good academic results in high-stake examinations, and were very concerned about high teacher-student ratios. In exploring teachers' perceptions of implementing an educational transfer like DI, this study seeks to uncover considerations that are distinct to the Singapore context. In doing so, we hope to add to literature at the intersection of international change and transfer, and forefront the influence of context.

Methods of Inquiry

We adopted a constructivist paradigm (Schwandt, 1998) in this research as we sought to understand the *perceptions* of teachers embarking on educational transfers. The constructivist paradigm foregrounded teachers' realities by privileging their voices in the co-construction of knowledge between participants and us. Further, studying participants in a naturalistic setting—during their graduate-level course—allowed us to understand perspectives that emerged organically in class, lending trustworthiness to our interpretations of their meanings (Hatch, 2002; Solomon, 1985). The constructivist paradigm is well aligned to qualitative research as both privilege participants' construction and interpretation of personal experiences in their sociocultural contexts, with researchers. The perspectives that emerged in classroom discussions and assignment reflections formed a valuable source of qualitative data that we interpreted through our conceptual framework and reported as our findings.

Research Context

Upon approval from our college's institutional review board, participants were recruited from two similar graduate-level DI courses the first author taught in two semesters. As the course was an elective, participants enrolled voluntarily, and were from Master of Education programs specializing in different aspects, like Curriculum and Teaching, Special Education, and English Language. Participants met for three hours once a week, over 13 weeks (one semester), with a one week recess. They engaged in topics that included appreciating learner diversity, understanding DI practices and implementation, and discussing controversies around DI (see Table 1 for specific topics). Participants were guided to understand the different elements contributing to DI from Weeks 1 to 11, with specific prompts given to engage participants in discussing DI challenges only in week 12 and 13. However, any concerns and challenges about implementation raised by participants between Week 1 to 11 were coded during data analysis. In Week 12 (Controversies), participants were broken into two camps and tasked to debate on the question: "Does DI work?" In Week 13 (Implementation Concerns), participants were asked to discuss concerns and possible solutions around DI implementation. The use of the word "concerns" was deliberate to encourage participants to raise any issues rather than only challenges. The weekly instructional format varied from analysis of course readings to class presentations. What remained consistent was the chance to engage in discussions weekly. Assignments included creating tools to profile learners, crafting a teaching unit using data collected from their own learners, and reflection journals. Assignment expectations were similar regardless of student participation in the research.

[Insert Table 1 here]

Participants

Out of 39 students, 38 chose to be involved in the study. As this article is focused on the perceptions of teachers in Singapore's public schools, data from eight non-MOE public school teachers were omitted. All 30 participants had at least three years of teaching experience. There were six males and 24 females; 11 Primary, 13 Secondary and six Post-Secondary teachers teaching Chinese Language, Chinese Literature, Design and Technology, Economics, English Language, English Literature, History, Life Skills, Mathematics, Nursing, Project Work, Research Studies, Science and Social Studies. To protect participants' identities, pseudonyms were used in the findings section.

Data Collection

We collected data through three main avenues: First, a questionnaire elicited background information (e.g., years of experience, subject taught). Second, audio recordings captured weekly discussions. These discussions were valuable as they were conducted in a naturalistic and relaxed setting that rendered unfiltered conversations and made explicit participants' thoughts (Hatch, 2002; Solomon, 1985). Having a variety of participants from different settings, like teachers, school administrators, and MOE officers, sustained conversations and added richness to the discussions. Third, written reflections of participants' insights on DI were extracted from classroom assignments. Participants were tasked to respond to reflection questions like: What were your pre-conceptions of DI before the course? What challenges do you foresee in implementing DI in your class/school? What might you do about these challenges? Written reflections were especially useful as research found that Asian students fare better on written rather than oral tasks (Kim, 2002). Therefore, analyzing their written reflections enabled us to

capture the thoughts of quieter participants, as well as other ideas that were not shared during class discussions. Memos were used to capture authors' reflections around ideas and methods.

Data Analysis

The researchers conducted "inductive analysis" (Hatch, 2002, p. 161) on the transcribed classroom conversations and written reflections. Both sources of data were entered into Atlas.ti, an analysis software, and coded together. Bracketing ideas from our conceptual framework so that participants' perspectives can emerge from the data, the first round of inductive coding identified a few key categories of challenges: structure (i.e. student organization, physical infrastructure, time and resources), school leadership (i.e. leadership support, scale of support), teacher-related(i.e. professional development, readiness and understanding of DI), school context (e.g. parents, students), and culture (i.e. assessment culture, teaching culture). Noticing that these categories overlapped with Hargreaves et al.'s (2002) technological, political and cultural perspectives of educational change, and that Hargreaves et al.'s categories were more exhaustive in encompassing our codes compared to our initial ones, we reorganized our first round of codes under these three perspectives. After reorganizing into these three broad perspectives, we carried out another round of inductive coding, allowing for emergent, not prefigured codes to surface under each perspective (Borkan, 1999). For instance, under the sociocultural perspective, participants' responses on challenges were analyzed for key attributes: "relinquish power," "be in control," "losing control," "control freak" were coded as "control". Codes like "control", "societal values and mindsets" and "comfort" were thus inductively derived using repeating ideas. Consequently, we changed Hargreaves et al.'s "cultural" to sociocultural to capture social meanings (e.g. equality as fairness, results-orientation) that surfaced from the data. Words or phrases used by participants, in both the discussions and reflections, were grouped together and

coded, with the frequency and source of each code captured in Table 2 for reference. However, we deliberately did not quantify participants' responses in our findings below as, coming from a constructivist paradigm, we believe that the interpretation of findings are subjected to both participants' and researchers' lens. An idea warranted representation (e.g., "control"; code count of 32), even though it was not referenced as frequently as other codes (e.g., "tensions"; code count 190), because of its bearings on core concepts framing the research.

[Insert Table 2 here]

We enhanced trustworthiness of this qualitative research through involving a range of informants/information, peer scrutiny, and comparison with previous studies. We included a range of informants so that "individual viewpoints and experiences can be verified against others and, ultimately, a rich picture of the … behavior of those under scrutiny may be constructed based on the contributions of a range of people" (Shenton, 2004, p. 66). To this end, we recruited participants from two separate but similar DI courses and from different contexts (i.e. different schools, teaching levels, subjects, teaching experience). We also compared classroom conversations with written reflections for recurring themes, and looked for discrepant data since quieter participants might not have raised certain points in class. Peer scrutiny involved both authors analyzing the data. In both rounds of coding, the second author conducted the initial coding, the first author reviewed the codes and both authors met to discuss overlapping and diverging insights before arriving at the final codes. Memos were used to capture authors' reflections around ideas and methods. Finally, we compared findings from this study with that

of other DI studies conducted (Ahn et al., 2015; Chien, 2012; Shayshon et al., 2014; VanTassel-Baska, Feng, et al., 2008b; Wu et al., 2015).

Authors' Positionality

Recognizing that participants were in a dependent relationship with the first author, we took steps to reduce the vulnerability of the relationship as guided by our institution's protocols. During recruitment, students were briefed on the research, with emphasis that their involvement was voluntary and withdrawal possible at any time. Likewise, it was stressed that assessment expectations were similar regardless of their involvement, and their grades unrelated to whether they embrace or reject DI. Students were given one week to make a decision on study participation. One student opted out of the study but permitted us to audio-record his classroom discussion on the agreement that his comments and reflections will be omitted during data analysis. As a course tutor, the first author was concerned about self-censorship amongst her students and made a conscious effort to remain as neutral as possible during discussions. Additionally, class discussion/participation were ungraded to encourage students to speak freely. Initial concerns about participants withholding their true sentiments appeared unfounded given participants' unfiltered and active expressions (see findings).

Similar to participants, the first and second author used to teach in Singapore public schools. This provided some understanding of participants' experiences of the Singapore education system. The first author had also studied and worked in U.S. public schools, enhancing her familiarity with the U.S. educational system. Both authors had also attempted DI in the course of their teaching. These experiences allowed the first author, in particular, to establish rapport with participants quickly. Having both left teaching in public schools for some time, the

distance allowed for clarifications on practices and beliefs that might seem obvious and prevented over-projection of personal insights. To address possible bias that may arise, the first author tried to ensure reflexivity in her emic memos by making a conscious effort to reflect on her own feelings through questions like: When did positive or negative feelings emerge, and why? How did I acquire this knowledge? How did I act on this knowledge? (Marshall & Rossman, 2014). In data analysis, both authors tried to be reflexive by asking questions like: What is the educational context that caused participants to perceive challenges? Are these challenges similar across the different educational institutions in Singapore? These questions increased sensitivity to subjectivities and alternative perspectives in data analysis; yet, we recognized that coming from a constructivist paradigm, findings reported can never be truly objective or "valid" as they inadvertently bear imprints of our perspectives (Schwandt, 1998).

Findings

Data on teachers' perceived challenges around DI implementation clustered around three main themes: sociocultural, technological and political concerns. Participants' classroom discussions are represented by "disc" and reflections by "ref."

Sociocultural conflicts over values and mindsets

Participants perceived that DI implementation is fraught with challenges, as it would require fundamental and extensive value and mindset changes given its origins from another education system and sociocultural context. They struggled with changing the existing instructional approach, societal beliefs and values, as well as the status quo.

"Control" as the existing instructional approach. Participants observed a cultural privileging of an instructional approach that tends to be more "authoritarian" and teacher-centered than that in the U.S. As such, participants perceived that what is required of a

differentiated classroom is culturally at odds with the existing preference for a stronger hierarchical relationship and teacher authority, rendering it challenging for both teachers and students to embrace a more student-directed and democratic relationship, and DI implementation in Singapore a challenge. "Cater[ing] to individuals is something that is not really considered" (Maira, disc). Participants sensed a stronger hierarchical relationship and teacher authority in contrast to the U.S. and questioned the viability of DI in Singapore.

Epistemic control. Participants felt that relinquishing epistemic control over learning would require "re-culturing" teachers. Maira observed, "despite the changing paradigm of learning, teachers continue to see themselves as the holders of powerful epistemic knowledge that is then delivered rather than constructed with their students" (disc). As a result, teachers often "decide on what and how best to teach, resulting in a possible lack of sensitivity to students' interests and readiness. DI requires teachers to relinquish some of their power, re-assess their teaching, re-orientate students as active learners" (JiaTian, ref).

Classroom control. Participants also shared that there is a cultural expectation that teachers are to be in control of their classroom and that learning can only be effective with quiet and attentive students. Participants saw "convinc[ing] teachers that this [DI] would be something that would help the students, without them having to give up the idea that they are losing control of the classroom" (Maira, disc) as an uphill task. Many participants worried that trying something innovative like DI would make it "look like [the teacher] cannot control the class" (Shafiqah, disc). Joanne shared that many teachers would feel compelled to maintain a tight control of the class almost to the point of "look[ing] like a control freak" because they "always feel that when the class is noisy, this teacher has a problem with classroom management. When the class is very quiet, listing, cooperating, the class is in control" (disc).

Prevalent societal values and mindsets. Participants perceived that Singapore teachers' and students' mindsets of equality as fairness, and excessive valuation of results were obstacles to DI implementation.

Equality as fairness. Participants felt that the values of standardization as a means to ensure fairness, and equal as equitable, are commonly accepted by teachers in Singapore. However, they expressed that this belief is incompatible because DI is about equity rather than equality. In Liz's opinion, "current emphasis on equality and standardization makes [teachers] resistant to choice and diversity" (ref). Maira explained that "in the Singapore context, teachers can be constrained by the need to be uniform in the classroom. This could therefore be a challenge to DI as teachers may feel a greater responsibility to ensuring standardization rather than diversity in the classroom" (ref). Participants observed that the "national culture" considers education as an "instrument for economic success etc." (Maira, disc) through "filtering and allocation based on test performances" (YueRong, ref). The "reward for success and punishment for failure are high" (ShaoHong, ref). Equality in how students are treated is thus seen as fairness and aligned to the allocational nature of tests.

Participants also opined that students are accustomed to equality, and they may "perceive differentiation as unfairness" (ShaoHong, ref), and a form of discrimination or prejudice. As Stacy rued,

Another challenge would be that my student might feel unfairness or feel putdown. Unfairness for middle and high performing students as they might think that they are doing more work as compared to the lower performing students. However, on the other hand, the lower performing students might feel that they are inferior as they are given the seemingly 'simpler' task. (Ref)

Results-orientation. Participants regarded the Singapore education system as "achievement and results-oriented" (Shafiqah, ref), and "for Singapore teachers, [learning] outcomes are results" (Maira, ref). Exam- and result-orientation "affects our [their] mindsets in terms of our [their] willingness and readiness in carrying out DI in the classrooms" (Ivy, ref). In their opinion, immense emphasis is placed on examination performance as the culture privileges "evidence of learning" (Joanne, ref) in the form of "measurable and outstanding results" (Ivy, ref). Responding to a powerpoint slide in class showing that research on DI has shown increased student engagement in the U.S., participants pushed back on the evidence, pointing out that in results-driven Singapore, academic achievement rather than student engagement/response, is what matters ultimately.

> Singapore teachers are uncomfortable [with DI] because you cannot objectively see student learning is there. We want the data, we want it to be measured, hard objective data. If we cannot see the results, we are very uncomfortable. We want to make the link between DI and summative exam results, if there is no link or no results, they feel that it doesn't work. (Alicia, disc)

Further, participants observed that teachers become "not encouraged, not motivated and quite resistant" (Hadiya, disc) towards educational innovation if results are not achieved immediately: "Sometimes we go with the mindset that when we do DI today, tomorrow we will see results, drastic, fabulous results. And the reality is that it is not and then we give it up" (Jeevan, disc). This culture of results-orientation, participants highlighted, appeared to stand in the way of DI implementation.

Comfort with the familiar. Participants perceived that much of the inertia to change stems from familiarity with the existing teaching and learning practices that contrast with that

required for DI. Furthermore, they felt that the pull factor to persist with what they are doing is stronger than that to change given Singapore's educational success. Consequently, participants felt that many teachers are inclined to not only teach as they were taught, but also teach as they have always taught and in accordance with student preferences.

Teach as they were and have taught. As teachers were recruited from the top 30% of each cohort, participants saw teachers as having experienced success in the education system and are inclined to reproduce it. Maira explained that "teachers in Singapore themselves have benefitted from the education system. Therefore, they believe that teaching their students the way they had learnt would also bring the same advantages for [*sic*] their students" (ref). Shafiqah called it "social reproduction. My teacher taught me like this, so this is how I am going to teach. After all, I turned out fine. I am now a teacher, I graduated. … why change when there is nothing wrong?" (disc). Participants also observed that teachers, especially experienced ones, are more inclined to continue with tried and tested ways of teaching since "the traditional approach has paid off in terms of students' good results" (ref). Thus, DI and its focus on responsiveness towards students by using continuous assessment data to change learning content, process, product, and environment felt deeply unfamiliar to teachers who were used to a more teacher-directed and traditional approach.

Learn as I have learnt. Participants shared that students prefer the traditional, teacher-directed mode of instruction rather than the self-directed mode typically used in DI. Many shared that students find the undifferentiated approach a "comfortable format" (Liz, disc) because they were "used to sitting in the classroom where they are passive recipients and were familiar with the drill and practise mode" (Joanne, ref) of instruction. FenFen explained that the mindset of the student is inclined towards the undifferentiated approach because "the old system can produce

good results. Why not? [It is an] easier way" (disc). Students themselves, participants stressed, would also require "re-culturing."

Technological concerns around implementation

Participants raised concerns about how DI implementation could be challenged by technological limitations posed by school structures, time, and professional capacity.

School structures. Many of the perceived challenges centered on how the organization and physical infrastructure of schools are not conducive for conducting differentiated lessons.

Class size. Participants felt that Singapore's large class size is an inhibiting factor, especially in comparison to the noticeably smaller U.S. classes featured in Tomlinson's professional development videos on differentiation. A class of up to 42 students is "too big [and] too much to handle" (Karima, disc), so much so that participants were not confident learning objectives could be met for all students. They felt that any differentiation was limited to readiness groupings because "with a class of 40 pupils, readiness groupings was as much as I [they] could handle" (Arianna, ref).

Classroom space. Participants also worried about "space constraint" (Karima, disc), as they felt that a small classroom space versus high student ratio offered little flexibility in conducting small-group activities, a characteristic of DI. "In our classroom, we are unable to [move students around] because we have many students and the [classroom] layout is so limited. Then we are unlikely to ask them to move from group to group" (FenFen, disc). Next, participants shared that because Singapore schools do not practice a homeroom system, space in the classroom is not only limited but also shared between teachers. This results in a lack of autonomy over seating arrangement or organization of classroom space to support differentiation strategies—for instance, flexibility is something they deemed essential for effective DI: "Over

here [as opposed to the U.S.], most of us [teachers] move from class[room] to class[room]. You can't set up your learning centers as easily as you want" (Liz, disc).

Time. Participants perceived that there was insufficient time to develop resources and incorporate DI in a content-heavy syllabus.

Time for resource building. Participants raised concerns over a lack of time to develop resources and plan for DI as the production of DI seemed time-consuming and technologically inefficient. During class discussions, participants shared that teachers are very busy because they have to juggle heavy academic duties with non-academic responsibilities (e.g. co-curricular activities, committee work, event organization). A recurring perceived challenge mentioned was that "there are a lot of things to prepare for DI and creating diagnostic tests, diverse worksheets, sourcing for materials to meet students' interests, providing scaffolds for different groups of students, offering choice in product and ensuring clear rubrics" (Husna, ref), rendering planning for DI an uphill task.

> I will probably spend the entire year just creating worksheets without the time to do
> the other administrative matters and probably eat and sleep while I am at it. I felt
> that I will never be able to take up DI since the task looked so daunting. (Edward,
> ref)

Participants were further daunted upon planning a differentiated unit as part of their course requirements. In their reflections, many shared apprehensions about the heavy planning time. Liz (ref) went so far as to quantify that "a normal 120-minute undifferentiated lesson takes about 4 hours to plan... However, this lesson (excluding time taken to learn about DI, strategies and prepare materials) took me more than 10 hours."

Time to implement DI. Participants mulled over a content-heavy syllabus and lack of time to incorporate DI in the existing schedule. Collecting assessment data from students and using differentiated instructional strategies seemed time-consuming. Many felt the need to "keep on doing" assessments impractical because "their [students'] learning styles will change. … I find that I need to keep on changing the grouping, changing all the time" (FenFen, disc) and these activities expended curricular time. Participants felt angst about completing a content-heavy syllabus with "limited time to explore conceptual understanding" (Alicia, ref) as students completed practice "paper after paper" (Maira, ref).

Teacher capacity. Participants perceived that teachers were hindered from implementing DI on-the-job without professional development support and worried about being able to attend to student diversity sufficiently.

Professional competencies. Several suggested that the reluctance to implement DI stemmed from low confidence as teachers have "doubts about their own competency" (Ivy, disc). Participants acknowledged that ignorance and fear encumbers DI attempts. LengChuan felt that teachers have misgivings about whether they were "adequately trained" (ref). Alicia felt apprehensive, because "if the teacher doesn't even know" different pedagogical approaches that could be used to cater to varying students' needs, this ignorance will heighten "phobia among teachers about the competencies… to change your [their] style of teaching, and model for students using different ways of learning" (disc). Participants' perceptions of teacher capacities (or lack thereof) revealed a technological belief that DI cannot be implemented without a requisite set of technical "skills" and knowledge.

Addressing student diversity. Participants were unsure about how they could "cater to so many different permutations" (YuJia, disc) of student diversity, like "socioeconomic, parental

influence, cultural differences, language, gender and so on" (Stacy, ref). Relatedly, participants

were uncertain about how to assess for differentiation and "what kinds of assessment will be

useful for teachers to assess students' needs?" (BaoLing, ref). They shared that it would be

difficult to directly assess students because of the focus placed on the individual and his unique

interests, learning styles or level of readiness" (Maira, ref) and felt uneasy about the accuracy of

their judgments:

> With differentiation, it is all about decision-making, how do I know I am making
>
> the right decision? That's a big risk we are taking, we are actually putting them
>
> in boxes, and then catering to where we deem they are at at that point" (Stacy,
>
> disc).

Political tensions around professional discretion and stakeholder support

Participants perceived that it would be a challenge convincing teachers and stakeholders

to embrace DI because they lack professional discretion and support from stakeholders.

Professional discretion. Participants felt that they lacked autonomy because in

Singapore, the "needs of subjects, syllabi, and examinations are all controlled nationally" (Maira,

ref) thus reducing the autonomy school leaders were prepared to give teachers over what and

how they teach. This control extends to the amount of time a teacher could spend teaching a unit,

regardless of the pace of students' learning:

> Teachers were given two weeks to complete teaching one unit. This translates into a short
>
> and steep learning progression in students' learning within the classroom, where students
>
> were given limited time to explore conceptual understanding of a topic at great depth. As
>
> it can be seen from the unit plan, students are required to sit for a paper and pen

assessment after 2.5 weeks of teaching. Teachers have little control over the curriculum and hence they often face the dilemma between preparing their students for test or to allow their students to explore learning through mistakes and fun. (Alicia, ref)

Likewise, Joanne described the constant monitoring of students' work—"During book checking exercise, conducted once or twice yearly, we would be questioned if we did not give enough worksheets, notes, quiz and tests" (ref)—and felt that under such intense scrutiny, she had little room to differentiate her content, process, and tasks.

Tensions among stakeholders. Participants shared that DI implementation may vary across schools, with some adopting a school-wide approach and others department-wide or individualized approach. Participants found it potentially challenging to attain leadership, teacher, student and parental support for DI, resulting in tensions between supporters and detractors of DI.

Teacher resistance. Participants felt that teachers are "less open to new pedagogy" (Stacy, disc) and so it would be a formidable task getting a "buy in from the teachers" that is necessary for DI "to take off [given] the inertia to change" (Edward, ref). Their main concern revolved around convincing teachers to adopt DI, particularly given sociocultural reasons outlined in the above section.

I am very sure the teachers will ask, what are the outcomes we are going to achieve? They will be looking for what are the positive results we are looking at? Can you show me the results from others who have achieved this? So I am sure this will be one of the questions they have in their minds... We need to bring across to the teachers, that by using DI, it is going to help them in the future. (Arianna, disc)

Leadership resistance. Participants hypothesized leadership resistance in face of the "risk for (sic) performance" involved in undertaking DI. Edward explained that "if the teachers, school leaders or even your key personnel who are your middle manages do not believe in DI, it will be a tumultuous task to embark on, and it may ultimately cause DI to be ineffective." (ref) The challenge is compounded by regular leadership rotation, a hallmark of Singapore schools where administrators are often rotated every five years. As Alicia rued, "assum[ing] leaders are supportive about DI, if the leaders are just a few charismatic ones and they have to rotate to other schools, [DI] will just die a natural death" (disc).

Student resistance. Participants anticipated resistance from students because "students need time to adjust… and relearn how to learn in a new [differentiated] environment" (Alicia, ref). Liz expected that

> "DI can get stressful for students because they need to figure out what it actually
>
> means. And if this other teacher doesn't do DI, and [non-DI] is a very comfortable
>
> format, then you will get murmurs… This teacher always do this type of strange thing
>
> [DI]. It makes us [students] very uncomfortable. Can she [teacher] just tell us what she
>
> wants rather than get us frustrated?" (disc)

Participants also expressed concerns about students' negative reactions: "How will students feel if they do not receive the same materials as their classmates? Will they be labelled as students with learning difficulties?" (BaoLing, ref). Participants felt that students in Singapore are grade conscious and "very competitive. They will compare," (Liz, disc) adding to the perceived struggle of DI.

Parental resistance. Participants also felt that parents in Singapore are especially results-oriented and expected that parents will react negatively to new ways of teaching and assessment.

ShaoHong anticipated that "there is an atmosphere of fear and insecurity among students and parents which may cause them to perceive differentiation as unfairness" resulting in "increase[d] anxiety among parents" (ref*)*. BaoLing concurred that a "challenge is the parents' mindset. Will they welcome the idea of DI where their children's learning progress might differ from their classmates and they are taught differently and experience different learning experiences?" (ref). In a competitive and results-oriented system where equality is seen as fairness, participants fretted about parents' resistance to DI.

Discussion

This article examines the challenges teachers in Singapore perceived in implementing DI, an educational approach transferred from the U.S. Given that this is a qualitative study, we do not claim that the findings are generalizable; where there are contextual overlaps, transferability of insights could occur. This study could have been strengthened by including a wider range of participants (e.g., pre-service teachers, participants in other DI courses/workshops) and an additional data source (e.g., interview) to showcase different voices and enhance trustworthiness of data. Further, collecting comparative primary data from U.S. teachers, as opposed to relying on research literature, could yield sharper cross-national comparisons. Likewise, adding more comparative sites of varying levels of sociocultural-structural-educational similarities/differences, can offer a glimpse into the continuum of contextual differences and its influence on educational transfer endeavors. Nonetheless, findings from this article may illuminate the transfer of educational ideas across similar contexts or transfer of DI across different contexts.

Perceived challenges of the study's participants existed along sociocultural, technological, political dimensions and are shaped by their beliefs and preconceived notions—

realistic or not—of the origin destination. In grappling with conflicts emerging from the juxtaposition of different sociocultural norms, technological and political arrangements, participants face postmodern issues of epistemological ambivalence and uncertainty. We argue that educational change in a cross-national setting is neither acontextual nor acultural. Instead, it demands that we forefront the influence of society, culture, structures, politics, and other local exigencies, and we propose a refined theoretical framework through which these can be considered.

Teachers in Singapore perceived sociocultural challenges in their potential implementation of DI. They alluded to strong epistemic and classroom control as potential deterrence to DI implementation. They attributed the challenge to perceived incompatibility, where they view the Singapore school culture as "authoritarian" and teacher-centered, and the U.S. school culture as more democratic and student-centered. Indeed, scholars have reported that teachers in Singapore exhibited strong epistemic authority and embraced frontal teaching (Hogan et al., 2013; Liang & Dixon; 2011) and emphasized discovery learning less than U.S. teachers (Van Tassel-Baska, MacFarlane & Feng, 2006). Further, teachers admitted that they typically "don't see them [students] as individuals, but a group" and that "cater[ing] to individuals is something that is not really considered," highlighting sociocultural norms around teaching that depart from those in the U.S. U.S. teachers have been reported to value the uniqueness and esteem of individual students more than Singapore teachers, with Singapore teachers expressing concerns about "a new generation of students who have become more self-centered… [and who] worshipped individualism" (Van Tassel-Baska, MacFarlane & Feng, 2006, p. 44). Furthermore, their perception of lacking professional discretion, coupled with the burden of political

negotiations increase their sense that the task of undoing social and cultural reproduction around teaching and learning is insurmountable, thus revealing interactions across perspectives.

While these findings around sociocultural issues overlap with House and McQuillan (1998) and Hargreaves et al.'s (2002) perspectives around the need to reculture staff's beliefs of teaching, it also added a dimension to their perspective of "culture." As educational ideas cross borders, Singapore teachers' perceptions of sociocultural challenges in implementing DI supports comparative education scholars' assertions of the need to take the "culture" of origin and destination contexts into consideration (Rappleye & Kotmatsu, 2017 Sriprakash, 2009; Vavrus & Bartlett, 2012). Therefore, in considering the cross-national context of educational transfer, we renamed ways of thinking and being (i.e. culture) embedded within society, nation, or ethnicity as "sociocultural" to avoid misconceptions of it as merely ethnic "culture." Considering education transfer as acontextual or asociocultural (Garcia-Huidobro et al., 2017) simplifies the change process. Instead, we need to foreground contexts along the sociocultural fronts to address the perceptions of how change agents, like teachers, shape the reception and interpret educational ideas.

Teachers' perceptions of challenges in technological domains further highlight the salience of national differences. Their impression of local structural features being different, like class sizes being larger, interacted with global concerns around limited time for planning and insufficient professional competencies, intensifying their technological concerns. To illustrate, teachers were apprehensive about implementing DI in Singapore because they felt that DI could work only within a smaller class size, a feature they associated with U.S. schools. Their perception about class size is not unfounded. According to OECD (2016) statistics, U.S. average secondary school class size is reported as 25.7, while official estimates of class size in Singapore

is 34 (Mokhtar, 2018). In fact, our participants alluded that a class size above 40 is common. These concerns over structural issues echo scholars' findings around how structures, like timetabling and curriculum organization, as well as material conditions (Vavrus & Bartlett, 2012; Wu et al., 2015) challenge educational transfers and reiterates the need to scrutinize compatibility between origin and destination contexts. Policymakers, educators, and administrators studying the contextual differences between source and destination countries could then identify opportunities and limitations prior to embarkation of implementation. Further, the various dimensions need to be examined in relationship to each other, rather than in silos. For instance, while a larger class size (technological) might have worked in a teacher-directed classroom (sociocultural), teachers perceived this same class size as unamenable in a student-centered classroom that they have to create. Such technological structures, if left unchanged, would remain as obstacles to teachers' receptiveness of DI and, in turn, their propensities to reshape sociocultural notions of teaching and learning. In short, just as structures shape sociocultural perspectives and vice versa, the other dimensions also interact with each other.

Additionally, it is pertinent to consider teachers' *perceptions* of origin and destination contexts because they shape their attitudes and, eventually, implementation practices, regardless of whether their assessment of differences is accurate or perception of differences valid. To illustrate, participants' concluded that Singapore teachers have a "high level of workload" (Jeevan, ref) posing a challenge to DI implementation. While Singapore teachers work longer hours (45.7 hrs) than OECD average (38.8 hrs), they work marginally less than U.S. teachers (46.2 hrs) (OECD, 2019). Further, many of the concerns raised—around political resistance from stakeholders, as with the realities of school like planning time and responsibilities—may mirror

those of U.S. teachers (Brighton, et al., 2005). However, these similarities appeared to be downplayed by Singapore teachers as they focused on perceived differences (e.g. class space) over similarities (e.g. workload).

It is also necessary to examine participants' perceptions as they reveal potential threats to implementation. Given that participants in this study are experienced teachers who have self-enrolled in the module and spent 39 hours over 13 weeks discussing DI possibilities, they were nonetheless daunted by the challenges they perceived in embarking on DI, begetting the question of how teachers tasked to implement DI without appropriate professional development support would respond. Edward's observation that he would "probably eat and sleep while I am [he is] at it [differentiating]" and that he "will never be able to take up DI since the task looked so daunting" demonstrates palpable dread and resistance teachers face even before attempting DI. This points to the power of perceptions that Pajares (1992) alluded to—the complexity of teachers' work often compels them to rely on beliefs rather than facts. This also necessitates awareness of, and consequently, clarification of sociocultural, technological, and political ignorance and misconceptions respectively. As scholars avered (Fullan, 2007; Rappleye & Komatsu, 2017; Sriprakash, 2009) and our study found, neglecting perceptions, particularly around comparisons between origin and destination contexts, could jeopardize educational change and transfer even before actual implementation. Therefore, understanding teachers' perceptions of challenges and addressing them *prior* to implementation is essential. For instance, teacher educators introducing educational ideas could help students unpack uncontextual differences, postmodern interpretations, as well as address their perceptions and misconceptions. Policy makers, teacher educators, curriculum planners and leadership may need to help with

resource building, paying particular attention to sourcing for materials from similar contexts or adapting materials for local students.

Intersecting the technological, sociocultural, and political dimensions is the postmodern perspective that sees the world as "complex, diverse, and uncertain" and full of contradictions (Hargreaves et al. 2002, p. 58). In a globalized world, where educational ideas cross national borders fluidly, the challenges teachers face reconciling difficulties arising from dissimilarities between origin and destination contexts reflects a postmodern condition. We illustrate by outlining how our participants grappled with conflicting sociocultural expectations in Singapore and the U.S. Participants worried about how to manage student diversity as they felt that valuing the traits of different children compromises the "equality as fairness" narrative in the Singapore context (Author, forthcoming; Tan, 2017). An equity-based philosophy like DI (where students are given what they need to succeed) was seen to be at odds with the equality-based philosophy (where students are given same opportunities) that teachers in Singapore are used to. Such are the postmodern contradictions teachers grapple with when educational ideas transfer across contexts. Likewise, they questioned how ideas from a society that privileges individualism (the U.S.) more can align to a society that privileges the collective (Singapore) more.

Participants also struggled with determining what is "objective" or "right," reflecting an engagement with epistemological issues associated with postmodernity. These postmodern concerns are made more complex by sociocultural forces in their educational contexts, leading them to question the compatibility of the import of educational ideas. This complexity is evident in the search for a new objectivity following an educational transfer. Participants highlighted the search for "measured, hard, objective data", evidencing the desire "to make the link between DI and summative exam results" (Alicia, disc); academic achievement serves as an objective

evidence that DI works. They remain unconvinced by evidence of increased student engagement/responses in the U.S. (VanTassel-Baska, Feng, et al., 2008b), arguing that such evidence is not objective, valid or sufficient in their results-orientated sociocultural context. Even when "objective data" of achievement were used to reflect efficacy, they questioned if similar achievement can be yielded given the different technological, sociocultural, and political forces at play in Singapore. This brings to fore conflicting notions of what counts as evidence in a postmodern globally porous condition as participants questioned evidence derived from a different context. Furthermore, participants were worried about their own judgements—"With differentiation, it is about decision making… but how do I know I am making the right decision?" Participants fretted about decision-making as a technological concern of whether teachers are "do[ing] it correctly or wrongly" (Ivy, disc). In learning a new educational concept and charting unexplored territories, they have to grapple with new uncertainties because localized, professional norms around best practices have yet to be established. Related to this is a bigger question: In a postmodern context, is there a "correct" or "wrong" way of approaching educational ideas that cross national contexts as local conditions introduce subjectivity and relativism?

By combining educational change and comparative pedagogy concepts in our research design and data analysis, we were able to examine educational change across national contexts with more nuance. We propose a visual to capture the refined comparative educational change framework (Figure 2). As we look through the peep-hole of the "telescope" in Figure 2, each perspective—sociocultural, political, technological—is illustrated as a lens to examine origin and destination context. These three perspectives are not mutually exclusive but interact with each other, for instance, sociocultural assumptions around learning overlap with political resistance

from stakeholders. Depending on context, contemplation of educational change and transfers may need to take into consideration a postmodern perspective (represented by a discretionary postmodern lens), especially since the postmodern condition of the 21st century has seen the acceleration of educational ideas increasing diversity, uncertainty, and complexities. Further, we relabelled the initial perspective of "culture" to "sociocultural" because the latter encompassed not just "school" or "ethnic" culture but also societal culture, that, in turn, is shaped by geographical, historical, educational, and political conditions. Each of these perspectives may vary in importance across contexts, enlarging or reducing, and added or removed. While this framework is still nascent, we hope that it can offer a lens through which to contemplate the intersection of educational change and transfer, and to explore the, perhaps, universal difficulties in transferability.
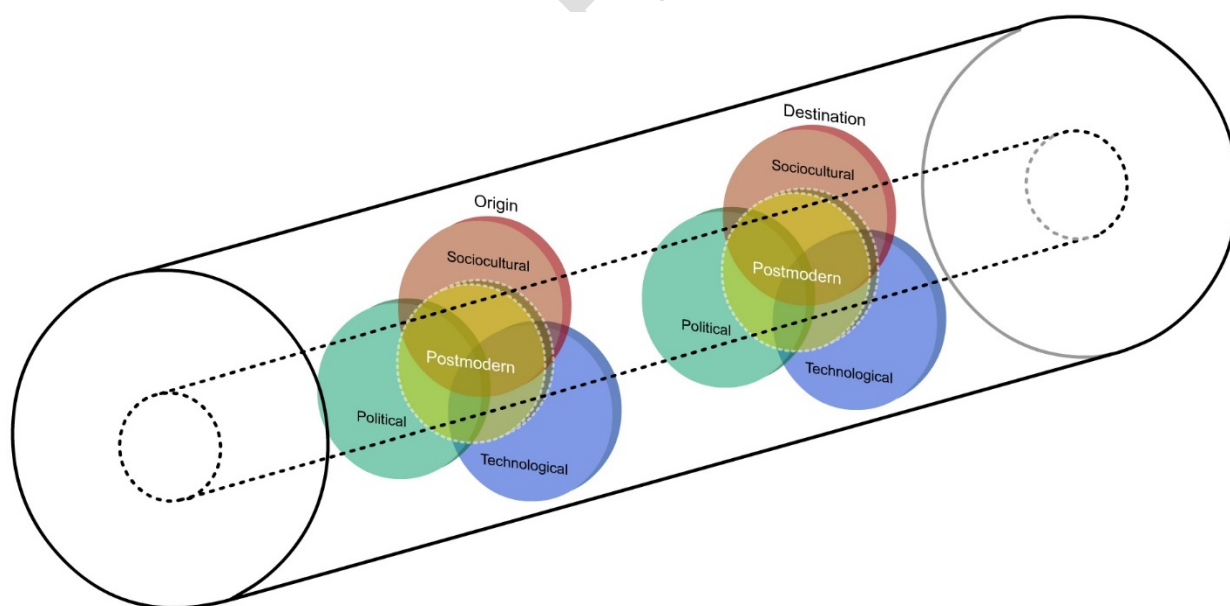

Figure 2: Comparative Educational Change Framework

In conclusion, researchers working on educational change can expand the field by forefronting the influence of contexts when ideas cross borders and continue enlarging understanding beyond the Anglosphere as Garcia-Huidobro et al. (2017) had urged. Likewise, the comparative educational change framework needs to be refined by applying it in different contexts. In refining and extending work on educational change in cross-national contexts, we hope that interpretations of educational change can eventually be both contextualized and epistemologically diversified.

References

Ahn, R., Catbagan, P., Tamayo, K., I, J. Y., Lopez, M., & Walker, P. (2015). Successful minority

pedagogy in mathematics: US and Japanese case studies. *Teachers and Teaching, 21*(1), 87-102.

Alexander, R. J. (2001). *Culture and pedagogy: International comparisons in primary education*:

Blackwell publishing.

Anderson-Levitt, K. M. (2003). A world culture of schooling? *Local meanings, global schooling* (pp. 1-

26). US: Palgrave Macmillan.

Beech, J. (2006). The theme of educational transfer in comparative education: A view over time.

Research in Comparative and International Education, 1(1), 2-13.

Borkan, J. (1999). Immersion/Crystallization. In B. F. Crabtree & W. L. Miller (Eds.), *Doing qualitative*

research (2nd ed., pp. 179-194). Thousand Oaks, California: Sage Publications, Inc.

Brighton, C. M., Hertberg, H. L., Moon, T. R., Tomlinson, C.A., & Callahan, C. M. (2005). *The*

Feasibility of High-end Learning in a Diverse Middle School. Storrs, Connecticut: National Research

Center on the Gifted and Talented.

Carter, L. (2010). Neoliberal Globalization and Learner-Centered Pedagogies: Posing Some Different

Questions. *Canadian Journal of Science, Mathematics and Technology Education, 10*(3), 223-231.

doi:10.1080/14926156.2010.504481

Chien, C. W. (2012). Differentiated instruction in an elementary school EFL classroom. *TESOL Journal,*

3(2), 280-291.

Datnow, A. (2002). Can We Transplant Educational Reform, and Does It Last? *Journal of educational*

change, 3(3), 215-239. doi:10.1023/a:1021221627854

Denzin, N. K., & Lincoln, Y. S. (2008). Introduction: The discipline and practice of qualitative research.

In N.K. Denzin & Y.S. Lincoln (Eds.), *The Sage handbook of qualitative research (3rd ed. Pp. 1 - 32)*,

Thousand Oaks, CA: Sage.

Department of Statistics Singapore. (2016). Population Trends 2015. Retrieved from

www.singstat.gov.sg

Department of Statistics Singapore. (2018). Population and Population Structure.   Retrieved from

https://www.singstat.gov.sg/find-data/search-by-theme/population/population-and-population-

structure/latest-data

Fink, D., & Stoll, L. (2005). Educational change: Easier said than done. In A. Hargreaves (Ed.),

Extending educational change (pp. 17-41). New York: Springer.

Fullan, M. (2007). *The new meaning of educational change (4th Ed.)*. New York: Teachers College Press.

Garcia-Huidobro, J. C., Nannemann, A., Bacon, C. K., & Thompson, K. (2017). Evolution in educational

change: A literature review of the historical core of the Journal of Educational Change. *Journal of

Educational Change, 18*(3), 263-293. doi:10.1007/s10833-017-9298-8

Goodwin, A. L., Low, E. L., & Ng, P. T. (2015). Developing teacher leadership in Singapore: Multiple

pathways for differentiated journeys. *The New Educator, 11*(2), 107-120.

Gopinathan, S., & Deng, Z. (2016). PISA and high-performing education systems: explaining Singapore's

education success AU - Deng, Zongyi. *Comparative Education, 52*(4), 449-472.

doi:10.1080/03050068.2016.1219535

Hargreaves, A., Earl, L., Moore, S., & Manning, S. (2002). *Learning to change: Teaching beyond

subjects and standard.* John Wiley & Sons.

Hatch, A. J. (2002). *Doing qualitative research in education settings*. Albany, NY: State University of

New York Press.

Hogan, D., & Gopinathan, S. (2008). Knowledge management, sustainable innovation, and pre-service

teacher education in Singapore. *Teachers and Teaching: Theory and Practice, 14*(4), 369-384.

Hogan, D., Kwek, D., Towndrow, P., Rahim, R. A., Tan, T. K., Yang, H. J., & Chan, M. (2013). Visible

learning and the enacted curriculum in Singapore. In Z. Deng, S. Gopinathan, C.K.E. Lee (Eds.),

Globalization and the Singapore curriculum (pp. 121-149). Singapore: Springer.

House, E. R., & McQuillan, P. J. (1998). Three perspectives on school reform. In A. Hargreaves, A,

Lieberman, M. Fullan, D.W. Hopkins (Eds.), *International handbook of educational change* (pp. 198-

213). Springer.

Kim, H. S. (2002). We talk, therefore we think? A cultural analysis of the effect of talking on thinking. Journal of Personality and Social Psychology, 83(4), 828.

Lewis, C., & Takahashi, A. (2013). Facilitating curriculum reforms through lesson study. *International Journal for Lesson and Learning Studies, 2*(3), 207-217.

Liang, R. Y. H., & Dixon, M. (2011). *Singapore teachers' espoused beliefs: Links to practice*. Research Brief; 10-004.

Lim, L. (2016). Globalization, the strong state and education policy: the politics of policy in Asia. *Journal of Education Policy, 31*(6), 711-726. doi:10.1080/02680939.2016.1181790

Lim-Ratnam, C.T., Lee, C.K., Jiang, H. & Sudarshan, A. (2019). Lost in adaptation? Issues of adapting Japanese lesson study in non-Japanese contexts. *Educational Research for Policy and Practice*, *18*, 263-278.

Liu, H. & Dervin, F. (2017). "Education is a life marathon rather than a hundred-meter race": Chinese "folk" comparative discourses on Finnish education. *Compare: A Journal of Comparative and International Education*. *47*(4), 529-544.

Low, E. -L., & Tan, O. -S. (2017). Teacher Education Policy: Recruitment, Preparation and Progression. In O-S. Tan, W-C, Liu, E-L. Low, *Teacher Education in the 21st Century* (pp. 11-32). Singapore: Springer.

Marshall, C., & Rossman, G. B. (2014). Designing qualitative research: Sage publications.

Mehan, H., Hubbard, L., & Stein, M. K. (2005). When reforms travel: The sequel. *Journal of educational change, 6*(4), 329-362.

Mills, M., Monk, S., Keddie, A., Renshaw, P., Christie, P., Geelan, D., & Gowlett, C. (2014). Differentiated learning: From policy to classroom. *Oxford Review of Education, 40*(3), 331-348.

MOE. (2005a). 25 Primary Schools to Pilot New Chinese Language Curriculum in 2006. Retrieved from https://www.moe.gov.sg/media/press/2005/pr20050712.htm

MOE. (2005b). Malay and Tamil Languages: Engaging Students through Lively Classrooms and Responsive Curricula - Government Accepts Recommendations of the Malay Language and the Tamil

Language Curriculum and Pedagogy Review Committees. Retrieved from

https://www.moe.gov.sg/media/press/2005/pr20051117.htm

MOE. (2005c). Ministry of Education Addendum to the President's Address - Mr Tharman

Shanmugaratnam, Minister for Education. Retrieved from

https://www.moe.gov.sg/media/press/2005/pr20050115.htm

MOE. (2009). Speech by Dr Ng Eng Hen, Minister for Education and Second Minister for Defence, at the

MOE Work Plan Seminar 2009, on Thursday, 17 September 2009 at 9.30 am at the Ngee Ann

Polytechnic Convention Centre. Retrieved from

http://www.nas.gov.sg/archivesonline/data/pdfdoc/20090924002/moe_wps_2009.pdf

MOE. (2013). FY2013 Committee of Supply Debate: 1st Reply by Mr Heng Swee Kiat, Minister for

Education: Hope - Opportunities for All. Retrieved from https://www.moe.gov.sg/news/speeches/fy-

2013-committee-of-supply-debate--1st-reply-by-mr-heng-swee-keat--minister-for-education--hope---

opportunities-for-all#sthash.qjPrZdUm.dpuf

MOE. (2018). Ministry of Education, Singapore.   Retrieved from https://www.moe.gov.sg/home

MOE. (2019). MOE FY2019 Committee of Supply Debate Response by Minister for Education Ong Ye

Kung. Retreived from https://www.moe.gov.sg/news/speeches/moe-fy2019-committee-of-supply-

debate-response-by-minister-for-education-ong-ye-kung.

Mokhtar. (2019, October 21). MOE 'cautious' on issue of smaller class sizes: Ong Ye Kung. *Today*

online. Retrieved from https://www.todayonline.com/singapore/moe-cautious-issue-smaller-class-

sizes-ong-ye-kung.

Naroth, C., & Luneta, K. (2015). Implementing the Singapore Mathematics Curriculum in South Africa:

Experiences of Foundation Phase Teachers. *African Journal of Research in Mathematics, Science and*

Technology Education, 19(3), 267-277.

Ng, P. T. (2015). What is quality education? How can it be achieved? The perspectives of school middle

leaders in Singapore. *Educational Assessment, Evaluation and Accountability, 27*(4), 307-322.

OECD. (2016). OECD.Stat.   Retrieved from https://stats.oecd.org/

OECD. (2019). *Education GPS* [TALIS 2018 - Teaching and Learning International Survey indicators]. Retrieved from http://gpseducation.oecd.org/.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of educational research, 62*(3), 307-332.

Rappleye, J., & Komatsu, H. (2017). How to make Lesson Study work in America and worldwide: A Japanese perspective on the onto-cultural basis of (teacher) education. *Research in Comparative and International Education*, *12*(4), 398-430.

Retna, K. S., & Ng, P. T. (2016). The application of learning organization to enhance learning in Singapore schools. *Management in Education, 30*(1), 10-18.

Ritzema, E. S., Deunk, M. I., & Bosker, R. J. (2016). Differentiation Practices in Grade 2 and 3: Variations in Teacher Behavior in Mathematics and Reading Comprehension Lessons. *Journal of Classroom Interaction, 51*(2).

Schwandt, T. A. (1998). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y.S. Lincoln (Eds.), *The landscape of qualitative research: theories and issues [pp. 221-259]*. Thousand Oaks, CA: Sage.

Shayshon, B., Gal, H., Tesler, B., & Ko, E.-S. (2014). Teaching mathematically talented students: a cross-cultural study about their teachers' views. *Educational Studies in Mathematics, 87*(3), 409-438.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for information, 22*(2), 63-75.

Solomon, J. (1985). Classroom discussion: a method of research for teachers? *British Educational Research Journal, 11*(2), 153-162.

Sriprakash, A. (2009). 'Joyful Learning'in rural Indian primary schools: an analysis of social control in the context of child-centred discourses. *Compare, 39*(5), 629-641.

Steiner-Khamsi, G. (2012). Understanding Policy Borrowing and Lending. Building Comparative Policy Studies. In G. Steiner-Khamsi & F. Waldow, eds., Policy Borrowing and Lending. World Yearbook of Education 2012. London and New York, pp. 3-17.

Strogilos, V., Tragoulia, E., Avramidis, E., Voulagka, A., & Papanikolaou, V. (2017). Understanding the development of differentiated instruction for students with and without disabilities in co-taught classrooms. *Disability & Society, 32*(8), 1216-1238.

Tan, C., & Ng, P. T. (2007). Dynamics of change: Decentralised centralism of education in Singapore. *Journal of Educational Change, 8*(2), 155-168.

Tan, E. K. B. (2017). Achieving a fair, equal society is a collective responsibility. Today. Retrieved from https://www.todayonline.com/singapore/achieving-fair-equal-society-collective-responsibility

Tan, K. H., Tan, C., & Chua, J. S. (2008). Innovation in education: The" Teach Less, Learn More" initiative in Singapore schools. *Innovation in education*, 153-171.

Tomlinson, C. A. (2001). How to Differentiate in Mixed-Ability classrooms. 2nd. *Alexandria, VA: ASCD*.

Tomlinson, C. A., & Moon, T. R. (2013). *Assessment and student success in a differentiated classroom*: ASCD.

Van de Grift, W. (2007). Quality of teaching in four European countries: A review of the literature and application of an assessment instrument. Educational research, 49(2), 127-152.

van Zanten, M., & van den Heuvel-Panhuizen, M. (2018). Opportunity to learn problem solving in Dutch primary school mathematics textbooks. *ZDM, 50*(5), 827-838. doi:10.1007/s11858-018-0973-x

VanTassel-Baska, J., Feng, A., MacFarlane, B., Heng, M. A., Teo, C. T., Wong, M. L., . . . Khong, B. C. (2008a). A Cross-Cultural Study of Teachers' Instructional Practices in Singapore and the United States. *Journal for the Education of the Gifted, 31*(3), 214-239.

VanTassel-Baska, J., MacFarlane, B., & Feng, A. X. (2006). A cross-cultural study of exemplary teaching: What do Singapore and the United States secondary gifted class teachers say? *Gifted and Talented International, 21*(2), 38-47.

VanTassel-Baska, J., Feng, A., Brown, E., Bracken, B., Stambaugh, T., French, H., . . . Bai, W. (2008b). A study of differentiated instructional change over 3 years. *Gifted Child Quarterly, 52*(4), 297-312.

Vavrus, F., & Bartlett, L. (2012). Comparative pedagogies and epistemological diversity: Social and materials contexts of teaching in Tanzania. *Comparative Education Review, 56*(4), 634-658.

Wertheim, C., & Leyser, Y. (2002). Efficacy beliefs, background variables, and differentiated instruction of Israeli prospective teachers. *The Journal of Educational Research, 96*(1), 54-63.

Wu, C. K.-Y., Wan, S. W.-Y., & Wong, Y. Y. (2015). Exploring Hong Kong secondary school teachers' teaching beliefs on differentiated instruction. *Teaching for Tomorrow Today*, 158.

Table 1

Overview of Course Syllabus

Week	Topic
1	Laying the Groundwork for Differentiation
2, 3, 4	Understanding Learner Diversity
5	Overview of Differentiation
6	Understanding How Children Learn
7	Role of Assessment in Differentiation I
8	Break
9	Role of Assessment in Differentiation II
10	Instructional Strategies Supporting Differentiation
11	Differentiation in Practice
12	Controversies around Differentiation
13	Implementation Concerns

Table 2

Breakdown of Codes According to Data Type

	Total	Classroom discussion	Reflection
Sociocultural			
Control			
Epistemic control	15	6	9
Classroom control	17	15	2
Prevalent societal values & mindsets			
Equality as fairness	43	27	16
Results-orientation	86	60	26
Comfort with familiar			
Teach as they were and have taught	26	15	11
Learn as I have learnt	22	18	4
Technological			
School structures			
Class size	17	13	4
Classroom space	17	16	1
Time			
Time for resource building	38	17	21
Time to implement DI	40	22	18
Teacher capacity			
Professional competencies	136	73	63
Addressing student diversity	53	35	18
Political			
Professional discretion	21	14	7
Tensions among stakeholders			
Teacher resistance	83	50	33
Leadership resistance	43	32	11
Student resistance	47	33	14
Parental resistance	17	9	8