



Differentiated instruction for students with SEN in mainstream classrooms: contextual features and types of curriculum modifications

Vasilis Strogilos, Levan Lim & Nasreena Binte Mohamed Buhari

To cite this article: Vasilis Strogilos, Levan Lim & Nasreena Binte Mohamed Buhari (2021): Differentiated instruction for students with SEN in mainstream classrooms: contextual features and types of curriculum modifications, Asia Pacific Journal of Education, DOI: [10.1080/02188791.2021.1984873](https://doi.org/10.1080/02188791.2021.1984873)

To link to this article: <https://doi.org/10.1080/02188791.2021.1984873>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 15 Oct 2021.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

Differentiated instruction for students with SEN in mainstream classrooms: contextual features and types of curriculum modifications

Vasilis Strogilos^{a,b}, Levan Lim^b and Nasreena Binte Mohamed Buhari^b

^aUniversity of Southampton, Southampton Education School, Southampton, United Kingdom; ^bPsychology and Child & Human Development Academic Group, National Institute of Education, Nanyang Technological University, Singapore

ABSTRACT

This qualitative study explores what contributes to the development of differentiated instruction (DI) through the use of curriculum modifications for the inclusion of students with special educational needs (SEN) in three primary Singaporean schools. Data were collected through semi-structured interviews, descriptive observations, lesson plans and focus groups. Five teachers, six allied educators, and two learning support teachers (n = 13) participated in this research focusing on five students as “cases” for the professionals to provide individualized examples. Participants often provided restricted understandings about DI as an ability driven approach, which mainly requires modifications in the content of teaching based on staff perceptions of student readiness. However, undifferentiated learning objectives and assessment methods were commonly used. The participants described an overreliance on the use of instructional modifications and lack of curricular and alternative modifications, which they deemed as inadequate and unfair for the students. The findings indicate resounding evidence that contextual constraints, such as class size, a common standardized curriculum and national exams constitute critical impediments that affect the types of curriculum modifications used. The participants proposed an “exams-free” pedagogy to enhance diversity in modifications. The research implies a need to consider the contextual features that impact upon the quality of learner-centred instruction internationally.

ARTICLE HISTORY

Received 18 November 2020
Accepted 20 September 2021

KEYWORDS

Differentiated instruction;
inclusive education; special
educational needs;
curriculum modifications;
disability

Introduction

During the past 30 years, a shift towards less segregated practices in the education of students with special educational needs (SEN) has dominated the education discourse in most countries. The establishment of inclusive schools where meaningful learning and participation is encouraged for all students has become an educational imperative with countries around the world increasingly embracing inclusive education as official policy and practice.

However, for students with SEN, meaningful access to a class curriculum that effectively responds to these students' strengths and individual needs remains an elusive issue (Morningstar, Shogren, Lee, & Born, 2015). To this end, several authors have urged necessary curriculum modifications (Kurth & Keegan, 2014; Lee, Wehmeyer, Soukup, & Palmer, 2010) to improve the inclusion of students with SEN through differentiated instruction (DI), and the identification of the features that can affect

CONTACT Vasilis Strogilos  v.strogilos@soton.ac.uk  University of Southampton, Southampton Education School, University Road, Southampton, SO17 1BJ, United Kingdom.

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

teachers' use of available DI strategies (Strogilos et al, 2020; Kurth & Keegan, 2014). This study, conducted in Singapore, therefore aims to explore the types of modifications teachers use for students with SEN in mainstream classrooms, the contextual features that influence the use of DI strategies, and teachers' overall understanding of this approach.

This research is timely and significant in the light of the current emphasis within the field of inclusive education to identify the most promising teaching approaches for responding to learner diversity within mainstream classrooms. Although Singapore has yet to officially embraced inclusive education as an education policy, nevertheless, its education system espouses the student-centric ethos of teachers engaging learners by responding to individual differences in interests, strengths and learning needs (MOE, 2015). This study is also particularly relevant to Singapore where learner diversity in mainstream schools have significantly increased due to the exponential rise in the enrolment of students with special needs in mainstream schools (Strogilos & Lim, 2019, Sin & Tai, 2019).

As an approach that can incorporate other inclusive teaching arrangements (e.g., mixed-ability grouping and choice making), DI provides a holistic framework in which all students' differences in readiness, interests and learning profiles can be accommodated. According to Tomlinson (2003, p.151), teachers use DI when they "proactively plan varied approaches to what students need to learn, how they will learn it, and/or how they will show what they have learned in order to increase the likelihood that each student will learn as much as he or she can, as effectively as possible". Tomlinson (2017) indicates that teachers can differentiate through the content, the process, the outcome of teaching or the learning environment according to students' readiness, interests and learning profile. The essence of DI is responding to individual learning needs and strengths while creating inclusive learning environments for all students. We do not consider DI as an approach that relates to ability grouping (Francis et al., 2017), as it has been wrongly associated by policymakers around the world, but as an approach that provides flexibility and variety in the delivery of the curriculum (Tomlinson, 2017). As such, we consider DI as an overarching approach within which curriculum modifications can be developed for students with SEN as part of the delivery of the curriculum for all students in diverse classes.

As Tomlinson (2017, p. 4) argues "*in a differentiated classroom, the goal is to have students work consistently with a wide variety of peers and with tasks thoughtfully designed not only to draw on the strengths of all members of a group but also to shore up those students' areas of need*". To this end, we consider the interrelation between the modifications of the curriculum and students' strengths and needs an inclusive approach. We draw here on Thomas (2004, p. 581) social relational model of disability in which "disability only comes into play when the restrictions of activity experienced by people with impairment are socially imposed". It is these restrictions that the curriculum might impose on students with SEND that this paper highlights. According to Janney and Snell (2013), modifications may be curricular, instructional or alternative. Curricular modifications refer to *what* is being taught (i.e., content), "instructional" concern alterations of the way instruction takes place (i.e., method), and "alternative" modifications involve *altered goals, instruction and activities*.

The Singapore context

In Singapore, the education system plays a central role in maintaining quality control through high-stakes examinations, such as the Primary School Leaving Examinations (PSLE) (the national exams all pupils in Singapore take towards the end of their final primary school year) (Heng, Song, & Tan, 2021; Ng, 2017). Although inclusive education is not part of the education policy in Singapore, significant recent developments signal a trend towards new educational directions, policy and resources supporting greater student diversity and including an increasing number of students with SEN within mainstream schools (Strogilos & Lim, 2019). A booklet entitled "Bringing out the best in every child", published by the Ministry of Education (MOE) (2015, p. 5) describes how the available

programmes and curricula cater for all students. In particular, it states that, “we have created a variegated education landscape with diverse pathways to provide our students with a variety of learning opportunities so as to best cater to their different interests, strengths, and learning needs”.

Over the last five years, mainstream schools have experienced a rapidly increasing enrolment of students with SEN to 26,000 students in 2018 (Sin & Tai, 2019), double the figure in 2013 (Wong, 2018). In 2016, the then Minister of Education (Ng Chee Meng) announced the inclusion of students with SEN within the Compulsory Education Act (Ministry of Education, 2016) to attend national primary schools either in mainstream or in government-funded special education schools. The National Archives of Singapore (2018) estimated 80% of pupils were in mainstream and 20% in special schools.

The growth in numbers of students with SEN in mainstream schools has been accompanied by an expansion of school human resources and pathways for professional development (Strogilos & Lim, 2019). The current team of teaching-based professionals to support students with SEN within mainstream schools, apart from psychological services, consist mainly of teachers, learning support coordinators (LSTs) and allied educators (learning and behavioural support) (AEDs-LBS). LSTs are mainstream teachers who are trained to work with students with either literacy or numeracy difficulties in the lower primary levels. AEDs-LBS are support personnel who work directly with students with SEN and also collaborate with both teachers and LSTs to provide learning and behavioural support. While AEDs-LBS and LSTs are trained to work with students with SEN (i.e., AEDs-LBS attend a one-year full time in-service diploma programme and LSTs a two-year part-time diploma programme), many teachers may not have received formal training in working with these students. Nevertheless, the latter will have received some training in DI in their initial education degree/diploma. Occasionally, paraprofessional personnel from a previous scheme who provide general classroom support, known as allied educator – teaching and learning (AED-T&L), might also be part of the teaching-based professional team.

Literature review

The use of DI in mainstream classrooms

Despite limited research on DI, studies have reported a positive association between the use of DI and teachers’ positive attitudes towards inclusive education (Saloviita, 2018), or a positive impact on students’ learning, especially those with SEN. For example, Lee et al. (2010), in their observational study in three school USA districts, found that the use of curriculum modifications in mainstream classrooms for the students with SEN increased their academic engagement and decreased their challenging behaviours. Siraj-Blatchford and Sylva (2004) in a longitudinal study in English early childhood settings, found that the schools with the more effective pedagogic practice were those that matched curriculum differentiation with children’s cognitive level.

Even though some studies have reported the use of DI as quite common in academically diverse classrooms (Saloviita, 2018; Shareefa, 2021), others have identified the lack of curriculum modifications for students with SEN. For example, in observational studies, in Greece and the USA, respectively, researchers identified limited curriculum modifications for students with SEN (Strogilos & Avramidis, 2016), and differentiation of materials which did not exceed 3% of the overall observation time (Wehmeyer, Lattin, Lapp-Rincker, & Agran, 2003). In addition to the limited use of curriculum modifications, Strogilos & Stefanidis (2015) found that Greek teachers surveyed indicated a moderate endorsement of the use of curriculum modifications for students with SEN.

Maulana, Smale-Jacobse, Helms-Lorenz, Chun, and Lee (2020) reported that Korean teachers struggle to implement DI and for this reason the government has introduced the SMART (Self-directed, Motivated, Adaptive, Resource-enriched, and Technology-embedded intervention) learning initiative to increase possibilities for DI. Shareefa, 2021, p.11), in a case study in a multigrade school in Maldives, found that “the learning materials and activities were targeted at different levels

of students' academic standards and interests ... and that with the means of re-teaching and continuous instructional coaching, lots of scaffolding was taking place for individual students". However, the teachers were using standardized assessments to evaluate student learning and not assessment in relation to students' ongoing progress. Wan (2020) reported that it was likely for teachers in Hong-Kong to practice DI and, in her survey, she found a positive association between teachers' engagement with professional learning communities and the practice of DI. The factors that were contributing to the development of DI practice was that teachers had a collective focus on student learning, while engaging in reflective dialogue and shared leadership in their schools. Many other studies have identified contextual features that hinder the development of DI. Among these are teachers' view that DI is a time-consuming process (Hertberg-Davis, 2009; Shareefa, 2021); their difficulty to locate and use effective resources (Gaitas & Alves Martins, 2017); or the large number of students per class, and teachers' strict commitment to cover the curriculum (Heng & Song, 2020; Strogilos et al., 2017).

Types of curriculum modifications

Overall, the type of modifications and their usefulness in mainstream classrooms have received limited research attention, although the implementation of useful modifications is highly encouraged (Janney & Snell, 2013; Tomlinson, 2017). In a descriptive observational study in the USA, Morningstar et al. (2015) identified reductions (51% of the observations) in the cognitive demands (i.e., less workload and picture-based stories than written stories) of work for the students with SEN in almost half of the participating 65 classrooms. Among the most frequent modifications were changes in the presentation on the materials (31%), environmental adjustments (23%), and response alternations (25%). Strogilos et al (2020) indicate that mainstream and special teachers plan and implement more "instructional" than "curricular" or "alternative" modifications and that these teachers believed their modifications adequately addressed the needs of the students with SEN. In a recent qualitative study in three USA schools, Finnerty, Jackson, and Ostergren (2019) noted that teachers provide access to the mainstream class content for students with severe disabilities when the modifications are tangible, student-centred and well-blended with the class materials and instruction.

In a study on the development and use of curriculum modifications for students with SEN in the USA, Kurth and Keegan (2014) found that beginning teachers created more functional "alternative" modifications, whereas more experienced teachers created more simplified modifications. They also found that special education teachers produced modifications of higher quality and clarity than mainstream teachers and teaching assistants (TAs). In other studies, the TAs were the ones to assume responsibility for the education of students with SEN by providing a high amount of verbal differentiation in order to make the classroom teaching accessible (Blatchford et al., 2011). In a recent study in the UK, Webster and Blatchford (2019) found ability grouping as the main structural approach to differentiation in secondary schools. Within ability grouping, the students with SEN were given a specific separate worksheet or the TAs were trying to bridge the learning gap through repetition and modifications to their language. However, in some cases the expectation was that pupils with SEN would produce less work than their peers, which made them feel that there was a stigma attached to being in the so-called bottom set. The authors concluded that "questions remain about what teachers, specifically, do to ensure classroom teaching and learning tasks are accessible to pupils with SEN" (p.108).

Aim and research questions

While there is consensus among researchers of DI that effective inclusion occurs when teachers modify the curriculum according to the needs and strengths of students, there is limited knowledge of contextual features that affect the understanding and use of DI and, in particular, the types of

modifications that teachers use and their influences. Thus, this study aimed (a) to explore how primary teachers, LSTs, and AEDs-LBS understand the term “DI” and the features associated with its implementation, and (b) to describe the types of modifications that they implement for students with SEN. The research questions were:

- (1) How do teachers, LSTs and AEDs-LBS understand the term “differentiated instruction”?
- (2) What are the contextual features that contribute to the development of DI and how do the participants experience these features?
- (3) What type of curriculum modifications do teachers, AEDs-LBS and LSTs use with students with SEN to access the general education curriculum and why?
- (4) What do the participants propose to enhance the use of DI?

Methods

We followed a qualitative approach in which, according to Denzin and Lincoln (2005, 3), “the researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them”. To answer the research questions we collected data through semi-structured interviews, descriptive observations, lesson plans (LP) and focus groups in order to understand the complex phenomenon of DI by drawing together opinions, observations and historical perspectives. Thus, in evaluating the processes and the products of DI, we consider that our interpretations are empirically based representations of the participants’ experiences and meanings (Patton, 2014).

Participants and settings

Teachers and other professionals in three primary schools participated in this investigation after an invitation email to 10 typical primary schools. We collected data only from the professionals working with students with SEN, while the students represented “cases” for the professionals to provide individualized examples. We selected schools which had at least one AED-LBS and a LST because we wanted to include professionals with different teaching-based roles. We included professionals working from Primary 1 (6-year-olds) to Primary 3 (9-year-olds) because the MOE has given more emphasis to these year groups (e.g., LSTs work only with students in these primary years). From these three schools, five teachers, five AEDs-LBS, one AED-T&L, and two LSTs (n = 13) working with five students with SEN participated in the research. We selected the participants after personal contact with the schools. We obtained consent from all the participants and ethical approval from the University and the Ministry of Education. Table 1 presents the demographic characteristics of the participants.

Data collection and analysis

Semi-structured interviews explored the perceptions and the decision-making process of the teachers, LSTs and AEDs (LBS and T&L) with regard to the types of modifications they plan and implement for the students with SEN. We asked them to provide and evaluate specific examples of modifications they had used, and we probed: how they understand the term DI; the learning objectives for the students with SEN; the types of modifications designed and implemented by the participants; and how the students with SEN are assessed. The 13 interviews lasted 27 to 45 minutes when one researcher was conducting the interviews and 35 to 90 minutes when two researchers were conducting the interviews or when the participants were providing more detailed examples in their answers. Both researchers had attended research training workshops in conducting semi-structured interviews before the beginning of this research study. All interviews were audio-recorded before transcription.

Table 1. Demographic characteristics of participants.

Schools and children	Teacher/ AED/LST	Gender	Age	Experience teaching	Months working with student	Education level	Year group	Class size	No. of SWD in class
School 1, Child 1, boy, 7 years old with speech and language communication impairment	Teacher	Female	43	17 years	18 months	Diploma	Primary 2	25	2
	AED LBS	Male	50	1 month	1 month	Advance	Primary 2	1	1
	LST	Female	52	2 months	18 months	Diploma	Primary 2	6	1
School 2, Child 1, boy, 8 years old with speech and language communication impairment	Teacher	Female	36	17 years	6 months	Diploma	Primary 3	33	16
	AED LBS	Female	36	6 years	9 months				
	AED LBS	Male	40	12 years	30 months	Masters	Primary 3	3	3
	AED T&L	Female	55	4 months	2 months	Bachelors	Primary 3	7	7
School 2, Child 2, boy, 8 years old with learning disability (dyslexia)	Teacher	Female	31	5 years	6 months	Bachelors	Primary 3	33	17
	AED LBS	Female	29	6 years	6 months	Diploma	Primary 3	3	3
	Teacher	Female	30	5 years	14 months	Bachelors	Primary 2	30	3
School 3, Child 1, girl, 7 years old with speech and language communication impairments, blindness/low vision & global developmental delay	AED LBS	Male	58	10 months	9 months	Diploma	Primary 2	9	9
	LST	Female	42	12 years	23 months	Masters	Primary 2	4	3
	Teacher	Female	42	5 months	9 months				
School 3, Child 2, boy, 6 years old with global developmental delay	Teacher	Female	42	10 years	9 months	PGDE (Pri)	Primary 1	30	3
	AED LBS	Female	61	17 years	9 months	Diploma	Primary 1	1	1
Mean		Female	44	10 months	9 months				
		Female	44	10 years	12 months				
				4 months					

To analyse the interviews we used thematic analysis which, as Braun and Clarke (2006) indicate, tends to provide a detailed analysis of some aspects of the data, which the researcher codes for a specific research question. In particular, using NVivo 11, we implemented the six phases of thematic analysis proposed by Braun and Clarke (2006): familiarize oneself with the data, generate initial codes, search for themes, review themes, define and name themes and write the report. We examined the participants' accounts in an attempt to identify repeated patterns of meaning, exceptional cases, and explanations of their practices. The core themes we elicited from the interviews included the different ways the participants understand DI (e.g., different content and individual teaching), the main features hindering its development (e.g., time, lack of training and teach for the PSLE), the same learning objectives and assessment methods for all students, and the delivery of instructional, curricular or alternative modifications. However, as Braun et al. (2019) indicate, reflexive thematic analysis "provides a coherent and compelling *interpretation* of the data, grounded in the data (p.847)", whereas they recognize the theoretical assumptions and ideological commitments of the researcher. As such, we consider that our analysis was a combination of our pre-determined understanding of DI based on the knowledge we had acquired in previous related projects (Strogilos et al., 2017, 2020) and the new themes we generated from the interviews.

Also, a research assistant, who was a teacher by training, and had been trained by the principal investigator in conducting observations, conducted 12 descriptive observations across the three schools. Each observation lasted between 30 and 60 minutes. In particular, we conducted five in-class observations where a class teacher and an AED-LBS were teaching together, five observations in which an AED (LBS or L&T) was teaching a student with SEN in a pull-out lesson, and two observations in which a LST was teaching a group of students with SEN in a pull-out lesson. We used a narrative observation protocol to record the actions of the participants with regard to the process of DI. The observer noted information with regard to the class activities, the strategies and the materials the teachers were using, and students' grouping arrangements. In particular, the observation was focused on the process of DI for students with SEN in relation to the process of instruction for all students in the class (e.g., different materials, more time and use of calculators). Thus, strategies related to curricular, instructional and alternative modifications for the students with SEN were described in the observation protocol. The focus was how the perceptions of the participants (as elicited through the interviews) were reflected in their praxis, acknowledging that the participants' perceptions and behaviours constitute different but interrelated findings. A short post-observation discussion allowed for member checking, elaboration and reflection.

We analysed all the observation notes, initially working independently to read three observation narratives and write reflective summaries to outline the number of modifications observed, their type and the person who had delivered the modifications. In an attempt to combine our inductive analysis with Janney and Snell (2013) framework on the type of modifications, we classified the modifications as curricular, instructional, or alternative. These types of modifications constituted the main categories in the analysis of the observations. Later, two researchers reviewed together the three reflective summaries of the observations to build consensus as to what constitutes "curricular", "instructional", or "alternative" modifications. After that, one researcher wrote reflective summaries for the rest of the observations and the other read again each observation narrative and the reflective summary, and either accepted or enriched the reflective summary.

Through an online platform, we asked all the class teachers who had students with SEN in their classrooms in the participating schools to upload a previously taught lesson plan (LP) in English or Maths in order to identify the types of modifications they design. We asked all teachers to submit a LP they felt represented their best practice on DI. We decided to include already taught LPs and not future LPs to avoid the risk of collecting atypical LPs created for the purpose of this research. We collected and analysed 30 LPs using the same procedures as in the observations.

Lastly, we conducted one focus group lasting 40 to 45 minutes in each school. Nine of the 13 invited participants joined the focus groups: one teacher, one LST and one AED-LBS (school A); one teacher, one LST and one AED-LBS (school B); and two teachers and two AED-LBS (school C). We presented the findings and our interpretations to the participants, and we asked them to express their views, or how they would interpret specific findings or what could be their recommendations for policy and practice. Thus, we used the focus groups as a tool to check the trustworthiness of our interpretations and to involve the participants at this stage as members in the production of knowledge. As in the interviews, we used thematic analysis for the focus group data.

Findings

Since the participating schools were following the National Curriculum, they were similar in the type of personnel and all the students, including those with SEN, who had to sit for the PSLE. The observed practices were similar across these schools. Hence, we do not present the findings school-by-school but thematically, making reference to individual schools when we identified slightly different views.

Understanding of DI

The participants provided several examples to describe what DI means to them. The dominant understanding across the schools was that DI includes modifications in the content of teaching based on students' perceived readiness. This echoes the restricted understanding of DI as an approach related to ability grouping. Very few participants considered DI as an approach in which student's interests and learning styles could be taken into consideration, or as a process in which modified activities and learning outcomes are an integral part of the curriculum. In particular, the participants described DI as an activity for teachers to match the content of teaching to the students' needs and abilities. In their examples, they mainly referred to the necessary reduction in the difficulty of the content or the use of "less content" to match with the perceived low ability level of the students with SEN. For example, *"instead of big words you use small words that kind of thing"*. (AED-LBS) and *"Ok, when we say there's fifteen words of spelling the child is not able to cope, we probably say ok you do ten or you do five"* (AED-LBS).

As it is evident in the above quotations, some of the participants' examples (i.e., reduction in the number of tasks) constitute, according to Tomlinson (2017, p. 4), "micro-differentiation or tailoring" and are often not adequate to address significant learning needs. However, in Schools 1 and 2 the participants talked about DI as a form of individual help and highlighted the contribution of AEDs and LSCs more emphatically than in School 3. The notion of DI as a form of individual support is not surprising considering the individual teaching sessions that the AEDs had with the students with SEN in these schools. However, in School 3 there was emphasis on the notion of DI as individual support too but also within the classroom. For example, *"Sometimes we get buddies for the student with SEN in class. So the buddies can help. Sort of help them with the instructions as well to break it down. We try to do that to let the teachers know to do that"* (AED-LBS).

Another common understanding of differentiation was as an action of providing multiple means to the presentation of the lesson in an attempt to respond to students' learning styles. As a teacher characteristically said *"I will still teach it to you using simpler words or a different kind of activity for you to understand. So for example a child who loves to see lots of pictures, the worksheets or the PowerPoint slides will have lots of pictures or videos. On the other hand there are pupils in my class like listening to stories so the concept can be told in a story manner ..."*

Two participants link DI with different learning outcomes, providing a slightly different notion to the understanding of DI that coincides with a more open approach to the education of students with SEN. Surprisingly considering its usefulness in children's learning, only one class teacher referred to the use of interest/choice as a form of DI in order students to have *"greater ownership of their work"*. (Teacher)

Features hindering DI

The majority of the participants, especially teachers, indicated that they do not use DI as much as they would like to and listed challenges that explained why it was difficult to use DI. A striking similarity across the three schools was the insufficient time to plan and implement DI and the expectation that all students in the mainstream class should learn the same content in order to be ready to sit for the PSLE. Even some AEDs-LBS and LSCs indicated that when having the students with SEN out of the class for individual or group teaching, they were teaching the class worksheets in order to help these students catch the rest of the class. The above findings show that the common National Curriculum and the requirements for the PSLE made participants highlight the lack of time to integrate DI activities in their practice.

“Because sometimes in differentiation you may have to come up with different sets of instructions; and then resources. You may differentiate in terms of the resources that you are going to give the child. So all this you need to plan, to have time for all this”. (Teacher)

LST: Ok but while we differentiate we must, we have to tailor it in such a way that when they are assessed ... they can pass. The thing is that the assessment paper is ... it is a bit difficult.

Interviewer: So, that itself is a barrier to differentiation?

LST: Maybe the teachers are actually working towards hoping that they can do that paper. (Teacher)

The parents expect me to keep up with the school's assessed work. Having them exam ready is another set of skill that I also need to teach. (AED-LBS)

Other features that the participants mentioned were the big number of students in the class, the lack of training, and the difficulties in teamwork among professionals. Especially in School 1, the AED and LST said that the teachers were not accommodating their suggestions for the students with SEN in the mainstream classroom. In addition, two participants in School 1 and 2 considered DI as a form of stigma highlighting that *“they are very aware and because they are very sensitive to their learning, they are sensitive to people's remarks also. So we don't give them a different worksheet in the classroom”* (AED). It seems that these two participants wanted to justify that DI was more appropriate when these students were working with the AEDs or LSTs individually which was the dominant notion of DI in their schools.

Learning objectives and assessment

We asked the participants to describe how they select learning objectives for the students with SEN and how they assess their performance. Across the three schools the teachers indicated that they try to plan and deliver the same learning objectives, and that they use the same assessment methods (e.g., tests or quizzes) for all students in the class. Also, all AEDs and LSTs said that they try to fulfil the class objectives when teaching students in pull-out sessions. Clearly, this practice contradicts with their understandings of DI as described above (i.e., based on their readiness), providing an inconsistent picture between their beliefs and practices. The following quotation vividly shows the influences that the role of the PSLE has on the education of these students across the three schools.

AED: Hmm, normally if you ask us our role as far as I'm concerned we still have to put the child back into the mainstream ... because we are in a main system, we are not a sped school where we cater to individual children, individual need. Now we are talking about how to bring the child with SEN be included into the system. That is Singapore context.

Interviewer: So what I'm hearing is that you're focusing on the same learning objective and assessment methods because of the system?

AED: Yes because of the system because end of day he still have to sit for PSLE. We can only give him extra accommodation, we can give him extra time but there is a national exam that content will not change for the child. End of day he still have to sit for the same content.

Even though the widespread assumption was that the learning objectives and the assessment are the same for all students as a means to maintain equality among the children, four participants commented beyond this debatable assumption recognizing that it is unfair.

"I definitely think it is unfair . . . Because she is definitely not at the same level as the rest". (Teacher)

Types of modifications in interviews, observations and LPs

The participants' comments that the content of instruction is almost the same for all students in the class were vividly replicated in our observations and their LPs. Unsurprisingly, the majority of the modifications we observed across the three schools were instructional (N = 75) and very few were curricular (N = 6) or alternative (N = 2, in School 3). We observed curricular modifications only during pull-out lessons with the AEDs or LSTs. In these lessons, the content was different and less challenging compared to that in the classroom. Similarly, in the LPs we identified 12 instructional, 2 curricular and no alternative modifications.

During the interviews, the majority of the participants repeated that they use the same textbooks and worksheets for all the students in the classroom but four of them mentioned that for the students with SEN, they have different expectations or alter the process of instruction or that they provide reductions in the content of instruction.

If he can't cope, I will let, I mean I, will cut down on. So like writing for him is expected of the rest to write you know a certain number of sentences . . . So for him, we will negotiate and then after he will come; ok can I just write five sentences. I say ok fine as long as you write something. (Teacher)

The participants talked about a variety of modifications they use for students with SEN, which could be included under the umbrella of process or instructional modifications (Lee et al., 2010; Tomlinson, 2017). The most common ones were "enhanced instruction through individual support" and "extra time" to complete their work in class or even at home

So I saw that this boy didn't understand. He didn't know when to listen, when to circle, so after that I actually took him one to one and I broke the sentence into; first I said what is a beginning sound. Which word has the same beginning sound. Is it this one, this one, this one? . . . After that I said when you hear which word has same beginning sound alright you just let's say hear the word box, what's the first sound? Quickly write it down. You know the steps for this autistic boy, once the step and its routine is established he knows what to do. (Teacher)

Individual support was also identified in some LPs. For example, in LP30 the teacher had specified that "*when some students have difficulty speaking, the other members [peers] would prompt her/him by using the questions on the question card*". Other less common strategies included prompting, peer tutoring and extra rewards but the participants also mentioned a small number of "disability-related" modifications such as A3 size worksheets for students with visual impairment, pictures for students with autism or, as in LP14, the use of assistive technology:

Students ask teacher the questions and the teacher answers them as fully as possible. Students who are shy will also be encouraged to key in their questions for the teacher to answer using padlet.

We also observed the use of prompting, extra time and individualized support by the AED (LBS or T&L). The below extract from our observation notes represents a typical example of instructional modification.

"The students then got into their groups to discuss the problems that they face when they visit the school bookshop and write it down in the A3 paper provided for each group. While the other students were in their groups, the AED went to the back of the class to sit and assist X and his three other group mates [Instructional modification: individual help]. The AED gave each student a piece of paper to write

down their own problem statement [Instructional modification: extra resources]. He proceeded to discuss and prompt students to describe the picture that was shown [Instructional modification: prompting]. I did observe that X was slightly more quiet compared to his other peers in the group. Thus, the AED asked him to say his opinion [Instructional modification: prompting]. After discussing about the picture, the AED told the students in the group to write down their problem statement in the piece of paper that he provided them with. This additional card-size, piece of paper was only provided by the AED to his group of students. For students that had difficulty spelling the words and constructing the sentence, he helped to write the problem statement on the paper while they verbally told him their problem statement [Instructional modification: individual help through verbal help and more guidance].

The majority of the in-class modifications were delivered by the AEDs, but sometimes the teacher tried to adjust the level of difficulty of individual tasks by either providing additional materials, such as helping words or tasks with varied levels of difficulties, to all students. A similar modified activity was evident in one LP in which the teacher had modified the activity in such a way that she differentiated the process to suit three different groups of pupils in the class. For group A, the teacher had provided 10 mini sentence strips to help with the written activity, while for groups B and C she had provided chunked texts instead of strips. She also had altered the content of the sentences in each group based on perception of the students' ability.

The above data provide a consistent picture with regard to the dominance of instructional modifications. The participants prefer the use of modifications, which mainly require changes in the delivery of the curriculum and not the content of the curriculum itself. Contrary to their understandings of DI in which the majority of the teachers associated DI with different "content" based on students' "ability level", in their practice, the content was usually the same.

Participants' proposals to overcome obstacles to DI

Towards the end of the interviews, we asked the participants to propose any changes they were considering necessary for the effective delivery of DI. Unsurprisingly, their proposals were in line with the obstacles to the delivery of DI as described above. The participants proposed an exams-free pedagogy for the students with SEN, necessary changes in the expectations and the mindset of teachers with regard to the learning outcomes of students with SEN and many practical changes. We present their proposals along with our proposals in the "implications for policy and practice" section.

Participants' reflections on the findings

During the focus groups, we presented the above findings and our interpretations to the participants and we asked for their views. In particular, we discussed the following: i) that the exam-oriented pedagogy promoted by the MOE does not enhance the development of DI; and ii) that the dominance of instructional modifications cannot support the individual needs of all students with SEN. The role of exams was discussed at length as the main feature hindering the development of DI. The participants reacted positively to our interpretation that the PSLE hinders the development of DI as teachers think that they have to teach the same curriculum to all students. In their descriptions, they expressed compassion regarding the struggles that the students with SEN face in their schools when the curriculum is difficult for them. Their dialogue mainly reflected their disagreement with the PSLE but at the same time their inability to do something about it.

Teacher: Yes, that is why we tend to because our hands are a bit tied because I mean if we have; if we differentiate, that means for let's say the weaker ones may not have done certain things.

Certain type of questions that will come out even if they are unable to do so. Because ultimately is to, we don't want to be caught in a situation whereby the parents will say that . . .

LST: He has not been taught.

The participants in Schools 2 and 3 agreed that the PSLE is an unfair means of assessment for students with SEN, and they raised concerns about its sustainability and relevance. They even considered that is an unfair means for all children.

LST: Then, the emphasis is less then actually we don't even have to have PSLE isn't it?

Interviewer: I agree. Haha.

LST: I mean we shouldn't have; I mean like you see for some of us we understood that the kids actually develop differently.

LST: Probably twelve years of your life is not enough for that development.

However, in School 1 the participants raised concerns about the view that the PSLE is not a fair means of assessment and argued that if students cannot meet the standards of a mainstream school, special schools might be a better option. School 1 participants raised concerns towards the education of students with SEN in mainstream schools which apparently justifies their view on the necessity of the PSLE. In Schools 2 and 3, the discussion was focusing more on the challenges that the centralized system poses for the schools, whereas in School 1 the participants made greater reference to the students' inability to fulfil the requirements of the mainstream curriculum. Apparently, the notion of an ability driven pedagogy provides little opportunities for other types of differentiation for these students.

When we said to the participants that we believe that instructional modifications are not adequate for the students with SEN due to the complexity in their needs, and that variety and flexibility in the modifications should be prioritized, they agreed that the type of modifications should be based on the child's needs. However, the majority of them, especially in School 1, were associating needs with "the ability of the child" and rarely with needs relating to interests/choices or learning styles.

Teacher: But like what you said he needed a bit of guidance and further instructions . . . But coming back to the differentiation in terms of process, currently this year I am taking a P1 class. Yes, I had to modify the content a bit for some of the pupils who are not able to recognize letters and I had to differentiate in terms of the quantity . . . You know how much the child is able to, for example five, they are suppose to learn five phonograms but this child is struggling to recognize the letters and sounds so I keep it to just one for the child. So it depends on the child.

Discussion

The participating teachers mainly applied undifferentiated learning objectives and assessment methods for the students with SEN as for the rest of the students. The participants justified the use of an undifferentiated curriculum as a requirement for the PSLE, which only allows the use of instructional modifications for these students. The teachers agreed that reliance on the use of instructional modifications was inadequate and unfair for the students with SEN. Contextual constraints, such as class size, a common standardized curriculum and high-stakes examinations constituted critical impediments that affected teachers' understanding, implementation and evaluation of DI as a pedagogical classroom practice to address the diversity of students. The findings reinforce the need to consider the contextual features that impact upon the quality of learner-centred instruction in the Singapore education system and internationally. More than an instructional strategy, DI is a teaching philosophy to meet the learning needs of all students while also being responsive to individuals.

The participants' understanding and knowledge about DI appear to be at odds with the prevalent practice of teaching the same content to all students. They tried to surmount their pedagogical discontent with the common practice of teaching the same content to students with SEN through their willingness to match the content of teaching to students' readiness levels. The fact that only one participant indicated the use of students' interest as a form of DI makes us wonder whether the majority of the participants disregard considering differentiation based on student-owned interests because of the overriding priority of preparing for PSLE through standardized curricula. Similarly, Heng and Song (2020) found that Singaporean teachers tend to prioritize a standardized notion of equality over equity to address diversity.

The participants attributed the challenges in the planning and delivery of DI to features

mainly associated with the school curriculum, the strong emphasis on the PSLE and other obstacles such as lack of time, large class sizes and stigma. As Walker and Musti-Rao (2016) note, the large class sizes in Singapore (i.e., 1 teacher: 35–40 students) cannot provide the adequate learning supports students with SEN need to succeed. As in other studies (e.g., Strogilos et al., 2017; Hertberg-Davis, 2009), the participants in this study talked about the lack of time to differentiate the curriculum due to the assumption that the common curriculum should be covered before any attempt can be made to provide extra arrangements for the students with SEN. Curriculum modifications are not an easy option for Singaporean teachers, because, as Poon, Musti-Rao, and Wettasinghe (2013) mention, there is stigma associated with modifications for examinations. In addition, Heng et al. (2021, p.75) found that Singaporean teachers were struggling to differentiate because they were teaching based on the PSLE's requirements and consequently "were more inclined to the assessment of learning – not for learning – practices".

One obvious question deriving from our findings is why teachers mainly use instructional modifications. A possible explanation for the lack of other types of modifications is that the participants were not willing to change the content of teaching, or to design activities based on student learning styles or interests because they were primarily concerned about students' performance in the PSLE. The instructional modifications seem to be a convenient way for teachers to work within the boundaries of an "exams-oriented curriculum", which should be "covered" (Strogilos et al., 2017; Hertberg-Davis, 2009).

More importantly, the lack of curricular or alternative modifications diminishes the quality of education provided to students with SEN since one would assume that a good majority of these students need such modifications (e.g., different reading texts). The dominance of instructional modifications was also reported in research in Greece (Strogilos et al., 2020) in which the authors argued that this practice is worrisome because flexibility and variety should be promoted to enhance the inclusion of students with SEN in mainstream classrooms. However, the almost exclusive reliance of the use of instructional modifications in Singaporean schools is in contrast with Webster and Blatchford (2019) study in the UK, where students with SEN had the opportunity to work on different content and Morningstar et al.'s (2015) study in which the teachers provided reductions in the cognitive demands of the activities for students with SEN. The variety in the types of modifications among different countries illustrates that teachers' decision on the type of modification is context-specific and depends on the local assumptions and beliefs shaped by the education policy in different contexts.

Implications for policy and practice

The implications of our findings, reflect the participants' and the researchers' suggestions as they were framed during the focus groups and later elaborated by the researchers. The first proposal suggests an exams-free pedagogy available for students with SEN or even all primary students because the participants of this study believed that it is unfair for these students to sit for the same exams as the rest of their classmates. This applies particularly to the PSLE which several participants expressed as an unfair means of assessment and questioned its relevance for their students with SEN.

Their comments reflect a growing call for the PSLE to be abolished (Ang, 2019) and changes occurring to these exams to de-emphasize individual performance relative to peers (Ministry of Education, 2019). We understand that the PSLE cannot be easily abolished in Singapore's "exam-driven" system and the use of DI to ease the burden that students with SEN currently face should be prioritized. For example, students could select the subjects they want to sit for exams based on their interests or they could choose their preferred way to show what they have learned (e.g., oral presentations, use of sign language or pictures, use of portfolio). In the light of Singapore's ratification of the Convention on the Rights of Persons with Disabilities (UNCRPD, 2013), the current discourse about rethinking the PSLE, the accommodation of diverse learning needs and the fostering of inclusivity among diverse students, highlights the significance of contextual features and their involvement to understanding the use of DI in mainstream schools. To this end, DI needs to be further understood and developed in schools for more effective implementation within Singapore's educational context.

The second proposal, voiced by the majority of the participants, refers to the exams-oriented expectations and mindsets of teachers regarding the learning outcomes for students with SEN. Our findings corroborate existing research that reveal the proclivities of teachers to place emphasis on covering the national syllabus to prepare their students for high-stakes exams (e.g., Hogan et al., 2013), thereby limiting how DI can be used. To enhance the effectiveness of DI, the participants proposed training for teaching staff to re-examine their beliefs and expectations and to consider how they can better support their students' learning needs. This training could also focus on how teachers can develop different types of modifications to respond to the current demands that the PSLE have placed on the students with SEN. For example, training could focus on the different teaching materials (e.g., reading texts) and processes (e.g., providing more examples) that teachers should use to support these students and not to expect them to work on the same materials as their peers. By doing so, teachers can provide a more child-centred teaching approach and increase these students' chances to respond, to some extent, to the demands of PSLE. Since DI is considered to improve students' learning (Tomlinson, 2017), its use can consequently improve students' performance in exams.

A third proposal that the participants expressed was training on using DI based on Tomlinson's (2017) framework. The overreliance on "instructional" modifications, as noted in our findings, limits the quality of education that is currently provided for students with SEN. Teachers, AEDs and LSTs can benefit from training in the development of a variety of modifications in order to improve the quality of education they offer to these students. They can learn to differentiate based on other characteristics of students such as their interests and learning profiles or elements of the curriculum (e.g., learning outcomes). We understand that any meaningful training on DI is less likely to have a positive impact without the actualization of the first two proposals.

Limitations and future research

This research has a number of limitations. The majority of the participating teachers had limited training on DI which may have skewed our findings. The fact that either one or two interviewers were present in the interviews might have influenced the interviewees' responses. Also, we did not collect data from the students and their parents and adding this to future research could help in designing policies aligned to their immediate needs. Future research might also look more carefully at the types of modifications offered to students with SEN through action research projects to encourage a better balance in the delivery of different types of modifications. Since this study showed that the modifications teachers use are mainly influenced by culturally related features, we would like to encourage other researchers to look into these features in other countries to provide a new perspective about research on DI in the international landscape.

Conclusion

Although DI is considered one of the most effective and promising teaching approaches for diverse learners, there is limited research on its efficacy for students with SEN. Contextual features within an education system can inadvertently contribute to teaching decisions and practices on the part of professionals that can actually contradict and subvert their existing knowledge and understanding of DI. This manifested in the alarming lack of variety in the development of modifications for students with SEN with an overreliance on the use of instructional modifications found in this research. This rather unbalanced use of DI as a default of contextual constraints compromises its efficacy as an approach to deliver an equitable, inclusive and meaningful quality education for students with SEN.

In illuminating the misalignment between the principles of DI and its practice within a particular context, this research also highlights the evolution of tensions and contradictions that the teaching-based personnel in this research acknowledged and experienced in their teaching decisions and practices for students with SEN. An invaluable opportunity therefore lies in engaging constructively with the tensions and discontent within them to expand their own understanding of and resolve ambiguities about inclusive education. To do would be to re-examine their own situated practices in the use of pedagogies like DI and to re-understand such practices as constituting situated forms of exclusion that contradict the ethos of inclusion. Participatory action research approaches can offer a safe and viable context for explicitly re-examining practices and mediating the engagement and negotiation within the school community and with relevant communities (such as teacher education professionals and Ministry of Education personnel) to design solutions to address situated forms of exclusion that are barriers to inclusive quality learning for students with SEN.

Acknowledgment

We would like to thank Prof Melanie Nind for providing valuable feedback in earlier versions of this paper.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the OFFICE OF EDUCATION RESEARCH-National Institute of Education [OER 12/16 VS].

Notes on contributors

Dr Vasilis Strogilos is an Associate Professor at the Southampton Education School, University of Southampton, UK. He has previously worked at the University of the Aegean and the University of Thessaly (Greece), the Roehampton London Online University (UK) and the National Institute of Education, Nanyang Technological University (Singapore). His research interests include co-teaching, differentiated instruction and multidisciplinary collaboration as means to the development of inclusive pedagogy and curricula for all students with a specific focus on students with disabilities.

Dr Levan Lim is an Associate Professor at the Psychology and Child & Human Development Academic Group at the National Institute of Education, Nanyang Technological University, Singapore. His research and teaching interests include the inclusion of persons with disabilities, teacher development for inclusion, and interventions for teaching and supporting students with disabilities.

Mrs Nasreena Buhari obtained her degree in Arts in interdisciplinary studies (Psychology and Sociology) from Adam State University, Colorado, USA. Prior to that, she completed her Diploma in Special Education from the National Institute of Education, Singapore, and worked as an Allied Educator (Learning & Behavioural Support) in both primary and secondary school settings. Research interests include inclusive education, educational inequalities, early childhood education, and home and school influences on academic achievement and wellbeing.

ORCID

Vasilis Strogilos  <http://orcid.org/0000-0003-1754-4306>

References

- Ang, J. (2019). Denise Phua again calls for MOE to abolish 'sacred cow' of PSLE. Retrieved November 2020 from <https://www.straitstimes.com/singapore/education/parliament-denise-phua-again-calls-for-moe-to-abolish-sacred-cow-of-psle>
- Blatchford, P., Bassett, P., Brown, P., Martin, C., Russell, A., & Webster, R. (2011). The impact of support staff on pupils' 'positive approaches to learning' and their academic progress. *British Educational Research Journal*, 37(3), 443–464.
- Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In P. Liamputtong. (Ed.), *Handbook of research methods in health social sciences*(pp.843-860). Singapore: Springer. Accessed date 4 October 2021. https://doi.org/10.1007/978-981-10-5251-4_103
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Denzin, N.K., & Lincoln, Y.S. (2005). Introduction: The discipline and practice of qualitative research. In N.K. Denzin & Y. S. Lincoln (Eds.), *The sage handbook of qualitative research*(pp.1-32). Thousands Oaks, CA: Sage.
- Finnerty, M.S., Jackson, L.B., & Ostergren, R. (2019). Adaptations in general education classrooms for students with severe disabilities: Access, progress assessment, and sustained use. *Research and Practice for Persons with Severe Disabilities*, 44(2), 87–102.
- Francis, B., Archer, L., Hodgen, J., Pepper, D., Taylor, B., & Travers, M.C. (2017). Exploring the relative lack of impact of research on 'ability grouping' in England: A discourse analytic account. *Cambridge Journal of Education*, 47(1), 1–17. <https://doi.org/10.1080/0305764X.2015.1093095>
- Gaitas, S., & Alves Martins, M. (2017). Teacher perceived difficulty in implementing differentiated instructional strategies in primary school. *International Journal of Inclusive Education*, 21(5), 544–556.
- Heng, T.T., & Song, L. (2020). A proposed framework for understanding educational change and transfer: Insights from Singapore teachers' perceptions of differentiated instruction. *Journal of Educational Change*, 21(4), 595–622.
- Heng, T.T., Song, L., & Tan, K. (2021). Understanding the interaction of assessment, learning and context: Insights from Singapore. *Educational Research*, 63(1), 65–79.
- Hertberg-Davis, H. (2009). Myth 7: Differentiation in the regular classroom is equivalent to gifted programs and is sufficient: Classroom teachers have the time, the skill, and the will to differentiate adequately. *Gifted Child Quarterly*, 53(4), 251–253.
- Hogan, D., Chan, M., Rahim, R., Kwek, D., Maung Aye, K., Loo, S.C., . . . Luo, W. (2013). Assessment and the logic of instructional practice in secondary 3 English and Mathematics classrooms in Singapore. *Review of Education*, 1(1), 57–106.
- Janney, R.E., & Snell, M.E. (2013). *Modifying schoolwork: Teachers' guides to inclusive practices* (3rd ed.). Baltimore, MD: Paul H. Brooks.
- Kurth, J.A., & Keegan, L. (2014). Development and use of curricular adaptations for students receiving special education services. *The Journal of Special Education*, 48(3), 191–201.
- Lee, S., Wehmeyer, M.L., Soukup, J.H., & Palmer, S.B. (2010). Impact of curriculum modifications on access to the general education curriculum for students with disabilities. *Exceptional Children*, 76(2), 213–233.
- Maulana, R., Smale-Jacobse, A., Helms-Lorenz, M., Chun, S., & Lee, O. (2020). Measuring differentiated instruction in the Netherlands and South Korea: Factor structure equivalence, correlates, and complexity level. *European Journal of Psychology of Education*, 35(4), 881–909.
- Ministry of Education. (2015). *Bringing out the best in every child*. Singapore: Ministry of Education.
- Ministry of Education (2016). Speech by Ng Chee Meng, minister for education (schools) at SPED conference 2016. Accessed 4 October 2021
- Ministry of Education (2019). Changes to the PSLE scoring and secondary one posting from 2012. Retrieved November 2020 from <https://www.moe.gov.sg/microsites/psle/PSLE%20Scoring/psle-scoring.html>
- Ministry of Social & Family Development (2013). *Singapore ratifies UNCRPD*. Accessed 4 October 2021. Retrieved from <https://www.msf.gov.sg/media-room/Pages/Singapore-Ratifies-UNCRPD.aspx>
- Morningstar, M.E., Shogren, K.A., Lee, H., & Born, K. (2015). Preliminary lessons about supporting participation and learning in inclusive classrooms. *Research and Practice for Persons with Severe Disabilities*, 40(3), 192–210.
- National Archives of Singapore. (2018). Parliamentary debates Singapore official report 2018, Volume 94, Number 81. Retrieved November 2020 from <http://www.nas.gov.sg/archivesonline/data/pdfdoc/20180806015/WQ-6Aug2018.pdf>
- Ng, P.T. (2017). *Learning from Singapore: The power of paradoxes*. New York: Routledge.

- Patton, M. Q. (2014). *Qualitative evaluation and research methods: Integrating theory and practice* (4th ed). Sage Publications.
- Poon, K., Musti-Rao, S., & Wettasinghe, M. (2013). Special education in Singapore: History, trends, and future directions. *Intervention in School and Clinic, 49*(1), 59–64.
- Saloviita, T. (2018). How common are inclusive educational practices among Finnish teachers? *International Journal of Inclusive Education, 22*(5), 560–575.
- Shareefa, M. (2021). Using differentiated instruction in multigrade classes: A case of a small school. *Asia Pacific Journal of Education, 41*(1), 167–181.
- Sin, Y., & Tai, J. (2019). Enable us to help kids with special needs, say those with disabilities. *The Straits Times*. Retrieved November 2020 from <https://www.straitstimes.com/singapore/education/enable-us-to-help-kids-with-special-needs-say-those-with-disabilities>.
- Siraj-Blatchford, I., & Sylva, K. (2004). Researching pedagogy in English pre-schools. *British Educational Research Journal, 30*(5), 713–730. <https://doi.org/10.1080/0141192042000234665>
- Strogilos, V., & Avramidis, E. (2016). Teaching experiences of students with special educational needs in co-taught and non-co-taught classes. *Journal of Research in Special Educational Needs, 16*(1), 24–33. <https://doi.org/10.1111/1471-3802.12052>
- Strogilos, V., Avramidis, E., Voulagka, A., & Tragoulia, E. (2020). Differentiated Instruction for Students with Disabilities in Early Childhood Co-taught Classrooms: Types and Quality of Modifications. *International Journal of Inclusive Education, 24*(4), 443–461. <https://doi.org/10.1080/13603116.2018.1466928>
- Strogilos, V., & Lim, L. (2019). Towards inclusive education in Singapore. In S. Halder, & V. Argyropoulos (Eds.), *Inclusive Practices, Equity and Access for Individuals with Disabilities: Insights from Educators Across World* (pp. 365–381). London: Palgrave.
- Strogilos, V., & Stefanidis, A. (2015). Contextual antecedents of co-teaching efficacy: Their influence on students with disabilities' learning progress, social participation and behaviour improvement. *Teaching and Teacher Education, 47*, 218–229. <https://doi.org/10.1016/j.tate.2015.01.008>
- 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. <https://doi.org/10.1080/09687599.2017.1352488>
- Thomas, C. (2004). How is disability understood? An examination of sociological approaches. *Disability & Society, 19*(6), 569–583.
- Tomlinson, C.A. (2003). Differentiating instruction for academic diversity. In J.M. Cooper (Ed.), *Classroom teaching skills*. Boston: Houghton Mifflin.
- Tomlinson, C.A. (2017). *How to differentiate instruction in academically diverse classrooms* (3rd ed.). Alexandria, VA: ASCD.
- Walker, Z., & Musti-Rao, S. (2016). Inclusion in high-achieving Singapore: Challenges of building an inclusive society in policy and practice. *Global Education Review, 3*(3), 28–42.
- Wan, S.W.Y. (2020). Unpacking the relationship between teachers' perceptions of professional learning communities and differentiated instruction practice. *ECNU Review of Education, 3*(4), 694–714.
- Webster, R., & Blatchford, P. (2019). Making sense of 'teaching', 'support' and 'differentiation': The educational experiences of pupils with education, health and care plans and statements in mainstream secondary schools. *European Journal of Special Needs Education, 34*(1), 98–113.
- Wehmeyer, M.L., Lattin, D.L., Lapp-Rincker, G., & Agran, M. (2003). Access to the general curriculum of middle school students with mental retardation. *Remedial and Special Education, 24*(5), 262–272.
- Wong, D. (2018). More support for allied educators to meet growing number of special needs students. Retrieved November 2020 from <https://www.channelnewsasia.com/news/singapore/more-support-for-allied-educators-help-special-needs-students-10053202>