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Identifying Instructional Design Strategies in Differentiated Instruction in China: A Systematic Review

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Abstract

Differentiated instruction (DI) is defined as an approach that allows teachers to strategically and proactively plan and vary curriculum design and delivery to address students' individual needs and to create meaningful student experiences. Since China's New Curriculum Reform in 2001, DI has been extensively employed to motivate teachers to be curriculum developers and researcher practitioners. Teachers were encouraged to develop a diverse curriculum by connecting students' and teachers' life experiences and prior knowledge to the course content. Despite this popularity, the DI practice has been met with great difficulties and challenges in China, and few studies have identified instructional design strategies that are effective and transferable to classrooms. Hence, the purposes of this systematic review are to identify: 1) the difficulties and challenges in DI practices in China; and 2) effective DI instructional design strategies used in China's K-12 classrooms. We used the Population, Intervention, Comparison, Outcome, and Study Design (PICOS) framework to develop our research question. Further, this research is guided through the PRISMA framework; and data analyses were guided through Tomlinson's six key instructional principles of DI and the What Works Clearinghouse educational practice guide. There are three major findings: 1) the characteristics of China's DI practice and related research designs and approaches in DI studies so that this review will provide future researchers with deep insight to conduct empirical research on DI; 2) the evidence levels of DI instructional design strategies and produced four strong evidence-level strategies, twenty-nine medium evidence-level strategies, and fourteen

minimal evidence-level strategies so that this review will provide instructors and future researchers with recommendations and references to promote the effectiveness of DI practice; and 3) the challenges and difficulties in today's DI practice so that this study will provide researchers and policymakers with a deep insight to offer solid support to build a DI-friendly community.

Keywords: differentiated instruction, instructional design, instructional design strategies, systematic review, K-12 education, China

Summary for Lay Audience

Differentiated Instruction (DI) is a responsive teaching approach in which teachers proactively make varied curriculum content, lesson activities, tasks, and tests according to students' diverse needs. Teachers plan varied approaches to make each student learn as much as they can, as efficiently as possible. In order to find ways to improve the efficiency and effectiveness of Chinese teachers in differentiating their instruction, our study extracted specific instructional design strategies and analyzed the evidence-level from existing studies about differentiated instruction in China, which provided great recommendations and guidance for teachers' future DI practice.

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Chapter 1 - Introduction

Confucius (2013) put forward 视其所以，观其所由，察其所安 [To teach a student starts with understanding the motives of his words and deeds, observing the path he has taken, and examining his mood when he does things] to develop diverse curriculum, including the content and delivery, when facing students with different life experiences. Since the time of Confucius, the concept of differentiation has continued to develop. In the twelfth century, the great Confucian scholar Zhu Xi (Huang, 2006) in Song Dynasty summarized Confucius' thinking as 因材施教 [teaching students in accordance with their aptitude] to help students to build new knowledge on their prior knowledge and their identities. However, starting from1460s, the civil service examination in Ming Dynasty restricted the exam content to the comprehension of ancient classic thinking and required a standardized answer written in a rigid format (Chu, 2019). Since then, "sit-and-get" instruction has gradually became more common in schooling.

By the 1900s, "sit-and-get" instruction became the predominant mode in schools globally, subject disciplines became isolated, and teachers became specialized in specific content areas (Gregory, 2011). Later, in the 1920s, the standardized test movement in China made standardized testing mandatory for all students at various grade levels (Chu, 2019). According to Chen Heqin (1921, as cited Chu, 2019), the standardized-testing approach meant tests with absolute answers and scores for each question. Standardized-testing approach supporters claim that standardized education will help policymakers and teachers track students' test-performance-based

achievement gap, identify problems in curriculum content and instruction, and take action to improve students' overall reading and math achievement levels to work toward educational equality (Karp, 2003). The rigidity of subject disciplines, instruction, and assessment methods necessitated by the standardized-testing approach did not yield the expected results, however. Data found that standardized education has not improved students' reading and math achievement, and the achievement level between rich and poor students has not significantly narrowed (Lee & Orfield, 2006). Au (2009) argued that standardized testing puts "non-standard" learners in a "triple bind" where (1) curriculum development is based on test content; (2) standardized content, in turn, works against "diverse" learner identities; and (3) high-stakes testing environments continuously creates intense pressures for marginalized students and students with individual needs to perform well (p. 68). Therefore, drawing on a postmodern approach that values students' dynamic interests, talents, and learning profiles, the differentiated instruction model strongly emerged in the late 1990s as a mindset for helping all students succeed (Blake, 1998). Meanwhile, the ever-growing diversity in the classroom as a result of large-scale immigration, and an increasing emphasis on students' unique and individual needs, have made teachers and education theorists recognize a need for differentiated instruction in the classroom.

1.1. The Definition of Differentiated Instruction

Differentiated instruction is broadly defined by Tomlinson as "varying instruction to meet the individual needs of all students" (1999, p. 15). Differentiated instruction is an approach that allows teachers to strategically and proactively plan and vary

curriculum design and delivery that builds meaningfully on and responsively to students' developmental needs (Gregory, 2011). Differentiated instruction is predicated on three assumptions: (1) educators expect the maximum development of each student; (2) students' readiness, interests, and learning styles are diverse; and (3) the speed and means to attain desirable knowledge and skills differ from student to student (Birnie, 2014). Accordingly, teachers' understanding of a child's situation becomes an ongoing cyclic decision-making process of perceiving students' current needs and interests, approaching various resources and activities, reflecting on the lessons taught, and moving on to the next lesson (Rhonda & Akane, 2018).

Based on the objectives, resources, and assessment methods in differentiated instruction, Rhonda and Akane (2018) conceptualized three types of differentiated instruction. The first type is *Adjustable Common Instruction,* where the objectives, resources, and assessment methods are all the same for each student. Teachers use classroom routines[1] to modify instruction to meet students' needs. Because the already presented classroom resources require minimal preparation time, this approach could be frequently provided for all students. The second type, *Specific Resources,* retains the same objectives and assessment methods for every student. Meanwhile, at times, some students (individuals or groups) require a specific teaching approach to achieve their learning objectives. Therefore, in this approach, different resources, including classroom facilities and tools, are employed to help students

[1] "Classroom routine" can be defined as "[E]stablished procedure(s) [in which the main] function is to control and coordinate specific sequences of behavior" (Yinger, 1979, p. 165, as cited in Barnes & Fives, 2020, p. 5), including seating arrangement, warm-up activities, class schedule, etc.

achieve learning success and foster their enthusiasm and confidence. The third type of differentiated instruction is *Individualized Instruction,* where the objectives, resources, and assessment methods are different for each student. All students sometimes may face difficulties and challenges in learning because of their diverse backgrounds and experiences and different rates of learning, so it makes sense that they will need individual plans for learning, practicing, and applying their concepts. This approach requires massive preparation time and therefore is used less frequently. Educators in many countries are developing and researching the above three types of differentiated instruction, including the United States, Canada, the Netherlands, Brazil, Chile, Singapore, Switzerland, Israel, Australia, Egypt, Malaysia, Ethiopia, and China (Bondie & Zushuo, 2018; Ginja & Chen, 2020; Maulana et al., 2020; Shareefa & Moosa, 2020).

1.2. The Curriculum Reform in China

The Chinese Ministry of Education (MOE) launched 第八次基础教育新课程改革 [the 8th Basic Education New Curriculum Reform] in 2001. One of the most critical goals of this movement was to reform the over-centralized top-down curriculum policy (Wang et al., 2013). The MOE's new curriculum encouraged a bottom-up, school-level differentiated curriculum framework and motivated teachers to be curriculum developers and researcher practitioners. The framework emphasized teachers' agency and creativity in developing differentiated instruction, encouraging teachers to connect life experiences and prior knowledge to course content. This approach resulted in the development of a differentiated instruction model known as

同课异构 [Same Course Content, Differentiated Instruction].

Same course content refers to identical course content, objectives, and assessment methods for all students. *Differentiated instruction* refers to a differentiated teaching approach towards different individuals and groups. This model is similar to both the *Adjustable Common Instruction* and *Specific Resources* approaches in setting the same objectives and assessment methods for each student, with adjustable instruction. Further, this model is flexible in providing either the same or different resources for each student.

Wang et al. (2013) suggested that at the beginning of the New Curriculum Reform, the "key philosophy [was] to improve teachers' professional competence and capacity through developing differentiated instruction" (p. 230). In 2018, the MOE reaffirmed that all curricula in China should be student-centered. Therefore, teachers would now need to affirm students' central roles in developing and delivering instruction. Several recent studies advocate for a balance in the positioning of students and teachers in instruction. For example, Wang (2021) acknowledged that teachers' prescriptive instructions might limit students' imagination and creativity. In his research, although the participant teachers attempted to deliver diverse instruction in a mathematics class, all the teachers could not satisfy the students' individual interests beyond the prescriptive themes of the definition domain, value domain, and monotonicity, which are compulsory content for grade 10 trigonometric functions. Wang found that ignoring the students' interests has also negatively influenced the students' enthusiasm for learning. Chen (2021) advanced that although teachers could

employ sophisticated strategies to prepare differentiated instruction, they would still quickly meet difficulties when facing the large number of students in classrooms[2]. Teachers reported that designing differentiated instruction is very time-consuming, but it was almost impossible to meet the individual needs of 50 people at the same time. Meanwhile, the extensive test-based curriculum and limited class time made it difficult to differentiate instruction. The resulting effect is that teachers often aborted their attempts at differentiated instruction and returned to a teacher-centered "definition-explanation-practice method" (Chen, 2021, p. 68).

1.3. Instructional Design Principles and Strategies

Without the guidance of instructional design principles and strategies, teachers may easily understand differentiated instruction as personalized or individual learning and therefore to pour all work time and effort into coming up with new and different materials for each student. Hence, a set of instructional design principles and strategies are significant in developing effective differentiated instruction in minimal time (Rhonda & Akane, 2018).

Smith and Ragan (2005) defined *instructional design* as "the systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation" (p. 4). In the instructional design process, instructional design principles and instructional design strategies are two significant elements to develop an effective teaching approach. As

[2] According to China's Ministry of Education, the class size should be built according to the standard of no more than 45 students in primary schools and no more than 50 people in secondary schools, and if it exceeds, it will be "large class size". Actual surveys have found that the phenomenon of large class sizes is still common, ranging from 60 to 80 (Ou, 2019).

such, in terms of instructional design principles and instructional design strategies, most effective differentiated classrooms stem from "the teacher's unflinching belief in the students' capacity to succeed, the teacher's knowledge about learners and learning, and the common sense of experience in a classroom" (Tomlinson 2014a, p. 175). In instructional design, *strategy* is a collection of methods to achieve a specific instructional goal (Chen et al., 2018). Chapman and King (2009) stated instructional design strategies are procedures used for learning and applying principles to classroom practice. Therefore, while instructional design principles are the beliefs, knowledge, and commonsense, the instructional design strategies are methods to connect the principles with real classroom practice. With guidance from the instructional design principles and strategies, teachers could employ relevant materials to organize activities that correspond with the classroom environment and students' backgrounds. In this way, teachers could provide students with the best learning experience. Identifying effective instructional design strategies congruent with instructional principles of the Same Course Content, Differentiated Instruction will benefit pre-service and in-service teachers in improving pedagogical preparation and enhancing students' learning experience.

1.4. Problem Statement

Many previous studies have explored strategies in classroom practice, but few studies identified instructional design strategies in Same Course Content, Differentiated Instruction that are most effective (e.g., Dixon et al., 2014; Lin, 2021; Tao, 2005). For example, Wang (2021) and Gao (2021) deductively integrated a set of

particular instructional design strategies, and Li et al. (2020) listed the instructional design strategies produced in the Same Course Content, Differentiated Instruction research between 2010 and 2019. However, none of these studies analyzed what instructional strategies are most effective and whether the instructional design strategies are transferable and translatable to classrooms of similar contexts. Moreover, little research has adopted a systematic method for inductively synthesizing instructional design strategies.

Further, effective differentiated instructional designs are significant in promoting students' learning expectations, motivation, and enthusiasm (Linnerbrink-Garcia et al., 2016). Several previous studies (e.g., Chen, 2021; Lin, 2021) focused on how differentiated instructional design strategies advance students' learning motivation and enthusiasm. However, little research has identified what classroom instructional design strategies may most effectively promote learners' motivation and engagement. As such, our proposed systematic review can provide a synthesized view of instructional design strategies in the Same Course Content, Differentiated Instruction*s* model within China's context.

1.5. Purpose Statement

The purpose of our systematic review is two-fold: (1) to systematically identify the exemplary instructional design strategies that could be employed in designing and delivering the Same Course Content, Differentiated Instruction in China and (2) to identify any reported challenges and difficulties that teachers faced in developing and delivering Same Course Content, Differentiated Instruction.

Chapter 2 - Literature Review

This chapter introduces the What Works Clearinghouse (WWC, 2020) Educational Practice Guide Framework and Tomlinson's (2016) six instructional principles of differentiation instruction. We adopted the six instructional principles of differentiation instruction from Tomlinson's comprehensive Differentiated Instruction Model (DIM) (2016) to categorize the instructional design strategies identified in the included literature. The *six instructional principles of differentiation instruction* have been applied in numerous previous studies (e.g., Smets & Struyven, 2018; Suwastini, 2021; Tomlinson, 2021). Further, we adapted the framework of the WWC educational practice guide to rate the evidence level of the identified instructional design strategies. WWC is an initiative established by the U.S. Department of Education's Institute of Education Sciences (IES). Inspired by the practice guide framework in the health care profession, WWC formulated a practice guide framework in educational research to present recommendations for educators to address pedagogical challenges (WWC, 2007). In this systematic review, we categorized the instructional design strategies from previous studies through Tomlinson's *six instructional principles of differentiation instruction* and then analyzed the level of evidence through the WWC educational practice guide framework. In so doing, we could demonstrate the appropriateness of using Tomlinson's *six instructional principles* and WWC educational practice guides as supportive research models for our study on instructional design strategies.

2.1. Tomlinson's (2016) Six Instructional Principles in DIM

2.1.1. The Historical Contexts Leading to the Development of the Differentiated Instruction Model

The six instructional principles of differentiated instruction were first identified by Tomlinson in her Differentiated Instruction Model (DIM) in 1999 in the first edition of *The differentiated classroom: responding the needs of all learners*. However, before 1999, solid literature covering the concept of differentiation existed, informing the development of DIM (e.g., Vygotsky, 1978; Amabile, 1983; Berliner, 1984; Gardner, 1983). In Vygotsky's (1978) seminal works on the *Zone of Proximal Development*, he put forward the concept of differentiation that teachers should create learning situations aligned with individual students' zone of proximal development. Zone of proximal development is a concept to create optimal learning when students work at a level that is just beyond the level at which they can work independently. Berliner (1984) realized that student achievement would be negatively impacted when students were given tasks that caused ongoing frustration. Gardner (1983) stated that human intelligence was manifested in many spheres, and Amabile (1983) emphasized that students' individual talents and engagement with learning can be maximized by helping students discover and pursue their interests.

Between 1990 and 1999, the effective education research continued to inform the concept of differentiation. (e.g., Jensen, 1998; Lasley & Matczynski, 1997; Schlechty, 1997). Lasley and Matczynski (1997) discussed that the mismatch between how a person was socialized and the culture in the classroom might hamper learning. Jensen (1998) focused on how various choices and a level of moderate challenge create the

best learning environment. Schlechty (1997) further found that contemporary diverse classrooms should be based on what motivates a particular student, recommending that teachers design instruction that is responsive to these motivations. Meanwhile, various studies started to focus on supporting differentiation and developed a differentiation model in effective educational practice research (e.g., Sternberg, 1997; Sullivan, 1996; Tomlinson et al., 1997). Sternberg (1997) confirmed that when instruction matched students' learning preferences, there was increased achievement. Sullivan (1996) stated that flexible teaching with a focus on learning style results in improved student achievement for a wide range of cultural groups. Tomlinson et al. (1997) conducted a case study of flexible teaching in primary grade classrooms, finding that teachers developed more positive attitudes about students from low-income and/or minority family backgrounds. Tomlinson et al. further reported that when teachers tried to employ flexible teaching toward culturally diverse young children, the students could usually achieve greater academic success. Lou et al. (1996) stated that students in small differentiated in-class learning groups had more positive attitudes about learning, and Ladson-Billings (1994) advanced that when curriculum and instruction match the learning style of students from diverse cultures, students will have produce better learner outcome, including academic excellence and transcendence of the negative effects of the dominant culture through cherishing the students' cultures and using their cultural heritage.

Since 1999, multiple researchers have worked on developing and refining Tomlinson's DIM framework (e.g., Smets & Struyven, 2018; Lentz, 2014; Callahan &

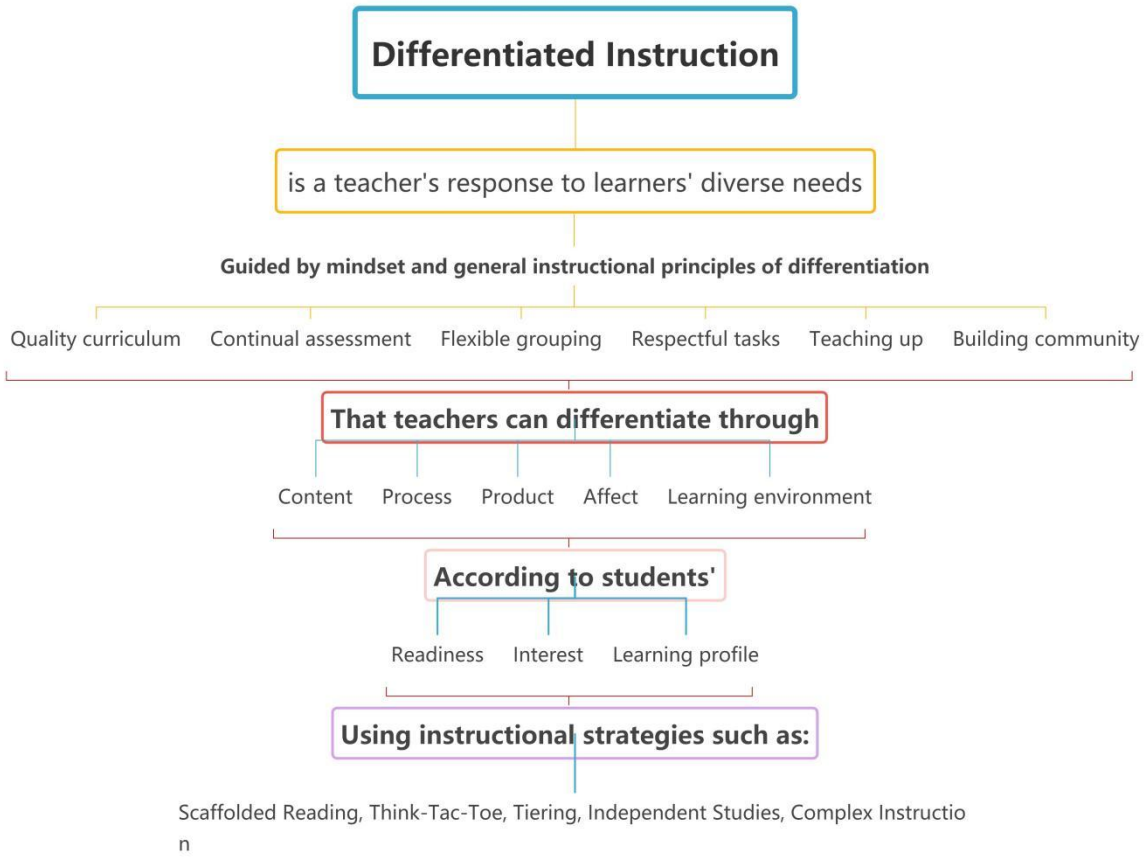
Hertberg-Davis, 2013); and applied the DIM into concrete practice (e.g., Wolfe, 2001; Brighton et al., 2005; Tomlinson, 2017; Tomlinson, 2021). Callahan and Hertberg-Davis (2013) developed the DIM framework specifically for gifted education. Lentz (2014) focused on teachers' professional development in DIM, and Smets and Struyven (2018) attempted to understand the philosophy of differentiated instruction under the ontology of systems theory. Meanwhile, Wolfe (2001) applied the DIM in classroom practice and suggested that a moderate challenge level creates an opportunity for optimal learning. Brighton et al. (2005) concluded that middle school students in differentiated classrooms showed significant achievement outcomes compared to control-group students. Tomlinson applied DIM to academically diverse classrooms (2017) and rural schools (2021). The DIM is a robust evidence-based theory in which its instructional principles were adapted as supportive instructional models for these studies.

2.1.2. Tomlinson's (2016) Differentiation Instruction Model

The Differentiation Instruction Model (DIM) put forward by Tomlinson experienced two significant revisions, in 2010 and in 2016. As an instructional model that provides guidance for teachers in addressing students' diverse readiness levels, interests, and learning preferences, it positions instruction as one of the critical elements in an interdependent classroom system. Tomlinson (2016) constructed a concept map of the differentiation model to present the key factors in effective differentiated instruction (Figure 1).

Figure 1

A Concept of Differentiated Instruction Model (Tomlinson, 2016).



The DIM figure indicates that:

- The core of differentiation is how a teacher attempts to study and respond to learners' needs. Students have varied degrees of background knowledge, including different life experiences, cultural orientations, and languages. And they have different interests, preferences for how they learn best, and feelings about themselves and about school. Teachers who practice differentiation have the responsibility to respect and fulfill students' learning needs.
- Differentiation is informed by a teacher's mindset or beliefs about ability and potential. Teachers who differentiate instruction should expect all

students to experience success as learners. Just like medical doctors do not prescribe the same medicine for all patients, teachers should be always mindful of students' varied learning needs and plan instruction accordingly.

- Differentiation is implemented through the general instructional principles such as high-quality curriculum, continual assessment, respectful tasks, community, respectful tasks, flexible grouping, and teaching up.
- Teachers can modify differentiated instruction based on students' needs through *content* (what students expect and are expected to learn), *process* (how students gain access to, explore, and express the content), *products* (how students demonstrate their learning outcomes after an extended period of learning), *affect* (how students' expectation and emotion change in the differentiated learning), and *learning environment* (both the physical and emotional nature of the classroom).
- The students' needs relate to their readiness level, interest, and learning profile[3].
- There are a variety of instructional design strategies that can be effective tools in helping teachers plan instruction that addresses learner variance.

The DIM does not provide a specific set of instructional design strategies—the strategies above are examples, not methods one must follow. Rather, DIM is a way of thinking about teaching and learning (Tomlinson, 2013). This model foregrounds

[3] Learning profile refers to a student's preferred learning mode (Tomlinson et al., 2003). A student's learning profile can be affected by factors including learning style, intelligence preference, gender, and cultural background.

students in teachers' thinking and instruction-designing. As a model built on the premise that each student needs and deserves a teacher who values them enough and works diligently to maximize a student's possibilities, DIM is both a way of teaching and a philosophy. DIM is framed around the six instructional principles. These six instructional principles represent the key elements in the DIM. Moreover, these six instructional principles present the six interdependent parts in a differentiated classroom system which teachers must consider when differentiating. In brief, the six instructional principles connect the DIM philosophy with instructional design strategies, and all six elements must be separately and/or collectively present in designing differentiated instruction. Therefore, our systematic review adopted these six instructional principles as six categories to classify the instructional design strategies identified in the literature on the Same Course Content, Differentiated Instruction in China.

2.1.3. Six Key Elements/Instructional Principles in DIM

Tomlinson noted that DIM is framed around six "general principles of differentiation" (2013, p. 288). The *six instructional principles* were developed from Tomlinson's (2010) *Five Non-Negotiables of Differentiated Instruction.* Building on the *Five* Non-Negotiables of high-quality curriculum, continual assessment, respectful tasks, building community (positive learning environment), and flexible grouping, Tomlinson added a sixth element—Teaching Up—to the DIM principles (Table 1).

Table 1

Tomlinson's Instructional Principles (Tomlinson, 2016)

Principles	Major Implications
High-Quality Curriculum	Curriculum-making should include a clear definition of what educators want learners to know, understand, and be able to do.
Continual Assessment	Recurrently use a variety of assessment methods to monitor the progress in reaching the annual learning goals.
Flexible Grouping	Students should work in a variety of group arrangements.
Building Community	Teachers should focus on building a positive community where students feel safe, valued, and supported.
Respectful Tasks	Teachers should ask students to do respectful tasks that are challenging, interesting, and worth doing.
Teaching Up	Teachers should raise "ceiling" for students. All students should work on tasks just above their individual comfort levels.

These *six instructional principles* have been adopted by many researchers (e.g., Brevik et al., 2018; Griful-Freixenet et al., 2020; Suprayogi et al., 2017; Tomlinson, 2017) as primary instructional principles in their differentiated instruction studies.

2.1.3.1 High-Quality Curriculum. A *high-quality curriculum* in DIM includes "planning with the end in mind" (Tomlinson, 2016, n. p.). It begins with a clear idea

of what goal the teachers want students to reach, before thinking about how to get students to reach that goal. Tomlinson put forward a concept of Knowledge, Understanding, and skills students need to Do (KUD) to help teachers create the curriculum. The KUD concept encouraged teachers to be concerned with what the learning experience would lead the students to Know and Understand the course knowledge; and be able to Do the skills that should be learned in a class.

The KUD concept in curriculum making starts with Knowledge includes the key facts, vocabulary, and examples as the learning outcomes. Isolated Knowledge is quickly forgotten. But the bond with Understandings will enhance the memory of Knowledge, and in turn, the Knowledge will help students make sense of the Understandings.

Then, designing good curriculum needs to identify the essential Understandings - the unit topic's concepts, principles, and big ideas. Identifying the meaningful, intriguing, and thought-provoking Understandings allows students to connect what they learn in other subjects, as well as how they connect to the world around them.

What we want students to be able to Do includes basic skills, thinking skills, discipline-based skills, planning skills, and social skills learned in the classroom practice. Basic skills include literacy and numeracy skills; thinking skills include reasoning and synthesizing ability; discipline-based skills include graphing, depicting, and describing; planning skills refers to students' goal-setting and project planning ability; and social skills refer to leadership and ability of collaboration.

A high-quality curriculum promotes student engagement in exploring ideas; and

challenges students to develop positive attitudes about doing rigorous and quality work. In Tomlinson's previous DIM, tiered expectations and goals of different students and teachers in curriculum making were one of the elements to guarantee a high-quality curriculum. However, Tomlinson's 2016 DIM changed and expressed a disagreement of externally presumed tiered goal settings and expectations towards students so that the tiered expectations and goals were excluded from the instructional principle of curriculum. Although students with diverse cultural backgrounds and different learning abilities will eventually reach different learning outcomes, they should start equally with a shared KUD and gradually adjust their goals in collaboration with teachers.

2.1.3.2 Continual Assessment. "Assessment is the element that steers instruction in the differentiated classroom" (Tomlinson, 2016, n. p.). After making a high-quality curriculum, teachers should employ continual assessments in three stages: pre-unit assessment, unit assessment, and summative assessment.

Pre-unit assessment, including ungraded tests or surveys, is to understand students' readiness and interests before the start of a unit. A pre-unit assessment will help determine how a student is in relation to the unit KUD and guide teachers in identifying initial learning groups and group tasks at the beginning of a unit.

Unit assessment is an ongoing process to monitor each student's progress in reaching the KUD and guides the teacher in planning the next classroom instruction step. Formative assessments, including exit cards, questions for the day, collective and one-on-one conversations, and observations with students, will help identify

instructional needs (e.g., re-teaching; raise the challenge; other specific assistance).

Summative assessment should take after learning a unit and be differentiated based on students' readiness, interest, and learning profile. All the variations of the summative assessment method should "allow students to demonstrate what they have learned in reference to the unit KUD (Tomlinson, 2016, n. p.)."

2.1.3.3 Respectful Tasks. "In any classroom, it is critically important that the task we ask students to do is respectful" (Tomlinson, 2016, n. p). To make a task challenging, interesting, and worth doing, educators should make the best effort to provide an appropriate learning experience for students according to their level of readiness, interests, and learning profile. However, teachers need to be cautious that effective, respectful tasks should not negatively influence how students position themselves in the classroom. Some students might perceive their status in the classroom as undervalued and neglected when they work on a simple task while other students seem doing a challenging, engaging, and thought-provoking task.

2.1.3.4 Building Community. *Building Community* is also known as Positive Learning Environment (Tomlinson, 2010). To realize effective differentiated instruction, teachers should engage in building and maintaining a safe, receptive, and supportive learning community.

In an effective differentiated classroom, students should be respectful and helpful to others and be willing to share their successes and those of their peers. Teachers are responsible for helping students understand what differentiation is all about and making everyone feel that they play an important role in the community. Students

should always have a say in how the community works and engage in identifying and solving classroom problems.

2.1.3.5 Flexible Grouping. The practice of *Flexible Grouping* helps build collegiality and support in a positive learning environment. Flexible grouping means "students work in a variety of arrangements" (Tomlinson, 2016, n. p).

Tomlinson (2010) suggested that students should be arranged into groups of similar readiness levels when participating in tiered activities. However, in 2016, Tomlinson revised the flexible grouping principle and suggested that students may work in small groups with either similar or different readiness levels, interest, or learning profiles; with a partner of either similar or different readiness level, interest, or learning, individually, or as a whole class. Grouping could be assigned by the teacher, by the students, or randomly to provide students with the opportunity to work in a flexible group on a frequent basis.

2.1.3.6 Teaching Up. *Teaching Up* was not recognized as a principle in Tomlinson's 1999 and 2010 DIM. In 2016, Tomlinson advanced that teachers should provide students with moderate challenges accordingly to their readiness level, interest, and learning profile. Therefore teaching up was integrated as an instructional principle to realize effective DI.

"Teaching up means raising the 'ceiling' for all students" (Tomlinson, 2016, n. p.). In case of assigning tasks that might bring excessive pressure, teachers need to make sure all students are working at a level of complexity just above their individual comfort zone. Providing each student with reasonable challenges and instructional

scaffolding will help students realize that their learning success progresses in their hard work.

Tomlinson (2016) suggests a tip to achieve the teaching-up practice - teachers should plan the most complex learning activity in the first place to challenge the most advanced learner and then modify the activity for students who are currently at relatively lower levels.

2.2. Educational Practice Guide

A “practice guide” is also known as practice guidelines, best practice guides, critical pathways, treatment protocols, simple practice guides, etc. It is a mechanism used by health care professions to assemble and communicate evidence-based advice to practitioners about care for specific clinical conditions (Pashler, 2007). As an initiative focused on helping teachers and administrators to make evidence-based decisions, the WWC adapted the practice guide model into educational research to present recommendations for educators to address challenges they face in their classrooms and schools (American Institutes For Research, 2020). Since 2007, What Works Clearinghouse (WWC) has produced 27 sets of practice guides to inform educators, administrators, parents, and others in classroom education. However, as Polanin et al. (2021) have stated, education is different from health care, the design of a practice guide in education should therefore be somewhat different. On the one hand, although thousands of practice guides published in health care provided models to proceed in education, there is no fixed template in use. The templates for educational practice guides may vary and change over time with accumulated experience. On the

other hand, because the educational practice guides depend largely on the researchers' expertise, the content of a practice guide should not be viewed as a cookbook but as a tool to assist teachers in decision-making, and teachers have the right to justify their practice based on authentic classroom situations.

The WWC provides a robust research framework with rigorous steps in developing an educational practice guide and the evidence-rating system.

2.2.1 Steps in Developing an Educational Practice Guide

There are four steps in developing an educational practice guide. First, the researcher selects a topic based on the needs of the field. Next, the researcher should recruit a panel to co-author the guide. Panels include at least two current educators whose expertise is in the topic field. Thirdly, the panelists conduct a systematic literature search and identify the relevant research studies. And then, after co-authoring a draft of the review, the practice guide is peer-reviewed to determine "whether the evidence cited in support of each recommendation is up to date and that studies of similar or better quality with contradictory results have not been overlooked" (Melinda, 2021, p. 58). Moreover, peer reviewers are also responsible for evaluating whether the level of evidence assigned to each recommendation is appropriate.

2.2.2 Levels of Evidence for Educational Practice Guide

The WWC modeled three levels of evidence to represent the quality and quantity of the identified studies supporting each recommendation, that are: strong evidence-level, moderate evidence-level, and minimal evidence-level.

The panel determines the evidence rating for a recommendation based on each of the criteria, including the extent of evidence, the effects on relevant outcomes, relevance to scope, the relationship between research and the recommendation, panel confidence, the role of expert opinion, and when assessment is the focus of the recommendation (Table 2) (American Institutes For Research, 2020). For a recommendation to get an overall strong evidence-level rating, each criterion must be rated as strong in the research. A moderate evidence-level recommendation includes at least one criterion rated as moderate, and none received a minimal rating. If one or more criteria resulted in a minimal rating, then the evidence level of the recommendation would be determined as minimal.

A *strong* evidence-level refers to evidence from more than one well-designed and implemented experimental study that indicates "the recommended practices improve relevant outcomes for the population of students relevant to the practice guide" (Melinda, 2021, p. 58). In other words, a strong level of evidence shows strong, causal, generalizable evidence to support the panel's recommendation.

A *moderate* evidence-level of evidence rating includes three types of evidence. The evidence could be from well-designed and implemented quasi-experimental studies, studies in which the sample students do not represent the relevant population of students, or only one well-designed and implemented experimental research. In other words, the moderate level refers to that the evidence in the relevant research may not be generalizable or casual to support the panel's recommendation due to the design or implementation of the studies.

A *minimal* evidence-level of evidence rating indicates that the panel could not pinpoint a body of evidence that demonstrates the recommendation could positively affect students' learning outcomes. A minimal level of evidence rating means that there is difficulty concluding the recommendation through an experimental or quasi-experimental design, the recommendation has not been studied, or the evidence lacks or is conflicted about its effectiveness. However, a minimal rating does not mean the recommendation is viewed as less critical than recommendations with strong or moderate ratings.

Table 2

Institute of Education Sciences (IES) levels of evidence for What Works Clearinghouse practice guides (American Institutes for Research, 2020, p. 30-31)

CRITERIA	**STRONG Evidence Base**	**MODERATE Evidence Base**	**MINIMAL Evidence Base**
Extent of evidence	The research includes two or more studies that meet WWC standards. The studies include more than one setting and a sample of more than 350 individuals.	The research includes at least one study that meets WWC standards. The study or studies either includes only one setting or a sample of fewer than 350 individuals.	The research does not include at least one study that meets WWC standards.
Effects on relevant outcomes	For at least half of the key outcome domains with findings meeting WWC standards, the following conditions are met: ● The mean effect from a fixed-effects meta-analysis is statistically significant; AND	For at least half of the key outcome domains with findings meeting WWC standards, the following conditions are met: ● The mean effect from a fixed-effects meta-analysis is statistically significant and	For over half of the key outcome domains with finds meeting WWC standards, at least one of the following conditions is met: ● The mean effect from a fixed-effects Meta-analysis is NOT statistically significant and Positive; OR

	• More than 50.0 percent of the fixed-effects meta-analytic weight comes from studies that Meet WWC Standards Without Reservations. The mean effect from a fixed-effects meta-analysis is not statistically significant and negative for any key outcome domain relevant for the recommendation.	positive; AND • More than 50.0 percent of the fixed-effects meta-analysis weight comes from studies that Meet WWC Standards With Reservations. Contradictory evidence from a fixed-effect meta-analysis that is statistically significant and negative is considered with regard to relevance to the scope of the recommendation.	• No studies meet WWC standards.
Relevance to scope	The research has direct relevance to scope—relevant settings, populations, comparisons, and outcomes evaluated.	Relevance to scope may vary. At least some research is directly relevant to scope.	No research relevant to the scope of the recommendation could be located.
Relationship between research and the recommendation	The recommendation is directly tested or the recommendation is a major component of the interventions evaluated in at least half of the studies.	The recommendation is directly tested or the recommendation is a major component of the interventions evaluated in less than half of the studies	The recommendation is not tested in the studies, and the panel provides references to one or more peer-reviewed publications that expound theories that support the recommendation.
Panel confidence	The pend has a high degree of confidence that a given practice is effective.	Panel may not be confident about whether the research has effectively controlled for other explanations or whether the practice would be effective in most or all contexts.	In the panel's opinion, the recommendation must be addressed as part of the practice guide; however, the panel cannot point to a body of research that rises to the level of moderate or strong.
Role of expert opinion	Not applicable.	Not applicable.	The recommendation reflects expert opinion based on reasonable extrapolations of research.

When assessment ts the focus of the recommendation	For assessments, research meets the standards of The Standards for Educational and Psychological Testing.	For assessments, research provides evidence of reliability that meets The Standards for Educational and Psychological Testing, but samples may not adequately represent the population on which the recommendation is focused.	Not applicable.
Overall level of evidence	A recommendations satisfies a “strong” level of evidence for all applicable criteria above.	A recommendation satisfies a “moderate” level of evidence for at least one applicable criterion above, and no criterion has a “minimal” level of evidence.	A recommendation satisfies a “minimal” level of evidence for at least one applicable criterion above, and all applicable criteria have at least a “minimal” level of evidence.

As such, the six instructional principles in DIM (Tomlinson, 2016) are widely accepted as a theoretical framework in differentiated instruction studies. Our research integrated these *six instructional principles* with the educational practice guide (WWC, 2020) as a research structure to explore the recommendations of instructional design strategies for guiding the Same Course Content, Differentiated Instruction practice as findings.

Chapter 3 - Methods

In this study, we systematically reviewed and analyzed the instructional design principles and strategies in the field of Same Course Content, Differentiated Instruction. This review was developed and guided by the Cochrane Handbook for Systematic Reviews of Interventions (Lasserson et al., 2019).

3.1. Developing the Research Question

We adopted the Population, Intervention, Comparison, Outcome, and Study Design (PICOS) model (Liberati et al., 2009) to develop our research questions: (1) What are the instructional design strategies that lead to effective Same Course Content, Differentiated Instruction in China? (2) What challenges and difficulties do teachers in China face when attempting to differentiate instruction in their classrooms? (Table 3).

Table 3

The PICOS Model (Liberati et al., 2009)

Parameter	Descriptor
(P) Population	Same Course Content, Differentiated Instruction within China's context
(I) Intervention	Conceptual and/or empirical-based instructional design
(C) Comparison	Not applicable
(O) Outcomes	Instructional design strategies/principles
(S) Study design	All

3.1.1. Evaluating the Quality of the Research Question

Published studies (e.g., Chen, 2011; Zhou, 2012; Wan, 2017) on Same Course Content, Differentiated Instruction practice have highlighted that employing instructional design strategies that meet students' diverse needs will elevate students' learning expectation and enthusiasm; achieve meaningful student learning experience; and result in optimal learning outcomes (Chen, 2011; Wang, 2016; Ran, 2011). Nonetheless, minimal empirical research has been conducted on the pedagogical effectiveness of differentiated instructional design to identify such strategies and principles (Zhou, 2012; Wan, 2016; Wan, 2017). Furthermore, few studies have deductively applied and examined well-established instructional design principles and strategies as part of a course design and delivery. Therefore, the quality of differentiated instruction and students' learning motivation were not assessed, nor the effectiveness of these well-established principles and strategies as theoretical structure (Wan, 2017). Little research has inductively summarized the effective instructional principles and strategies as recommendations for future differentiated instructional practice. Hence, our research questions are significant since it addresses these gaps in the literature.

3.2 Inclusion and Exclusion Criteria

We established the following criteria for inclusion in this review. First, the study must be based on differentiated instruction with same course content in which the objectives and assessment methods are the same for all students. Second, the study must present instructional design principles and strategies; or challenges and difficulties when developing and delivering the differentiated instruction.

According to the guidance of our institution librarian and the result of our pre-search, we established the following exclusion criteria in this review. Studies that were not conducted in Mainland China, Hong Kong, or Macao were excluded. Further, since China's Eighth Curriculum Reform started in 2001, studies that were published before 2001 were excluded. Studies that were not peer-reviewed in scholarly journals and those written in a language other than English were also excluded for feasibility purposes. Lastly, since grade school education and post-secondary education employ different pedagogical approaches, we limited the search to studies to the K-12 education system.

3.3 Selecting the Databases

With guidance from an academic librarian DH at our institution, we identified three educational databases and two multidisciplinary databases as appropriate for this review as their literature coverage included differentiated instruction. These five electronic databases are: (1) Education Database; (2) Educational Resources Information Center (ProQuest); (3) Academic Search Ultimate (EBSCOhost); (4) Scopus; and (5) Web of Science.

3.4 Search Terms

Guided by our research objectives and with the librarian's support in defining the search terms, we developed and conducted the search using the following Boolean search string:

"Differentiated Instruction" OR "Differentiated Teaching" OR "Differentiated Learning" OR "Individualized Learning" OR "Individualized Teaching" OR

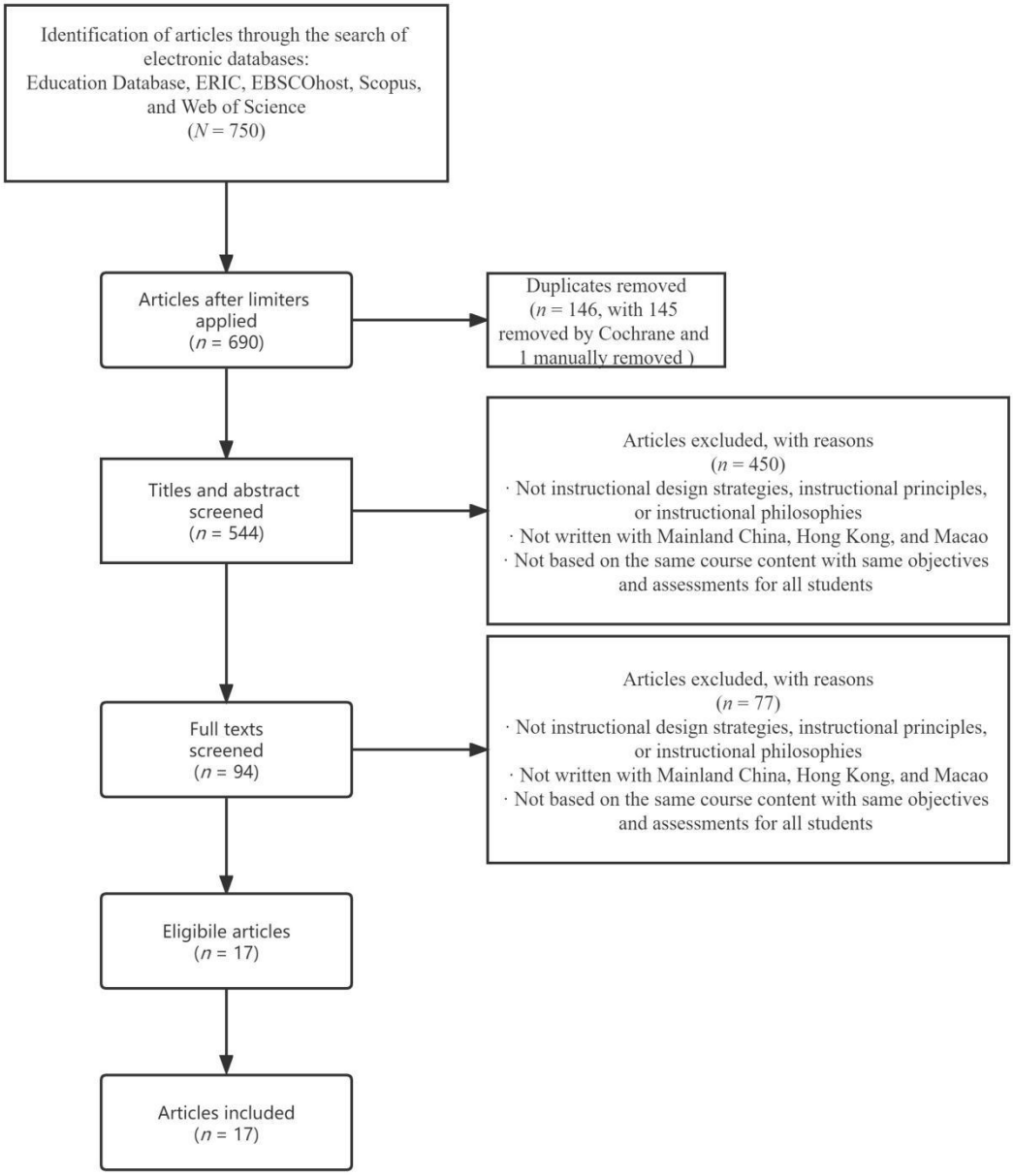
"Individualized Instruction" OR "Curriculum Differentiation" OR "Differentiated Curriculum" OR "Adaptive Learning" OR "Adaptive Teaching" OR "Adaptive Instruction") AND ("China" OR "Chinese" OR "Mainland China" OR "Hong Kong" OR "Macao") AND ("Instructional Strategies" OR "Instructional Strategy" OR "Instructional Principles" OR "Instructional principle" OR "Instructional Philosophies" OR "Instructional Philosophy" OR "Philosophies of Instruction" OR "Philosophy of Instruction" OR "Instruction" OR "Instructional"

3.5 Filtering the Studies

In this phase, two main steps were conducted. Two authors (HF and MA) first screened titles and abstracts and then filtered full-text articles. The two authors used the inclusion and exclusion criteria to independently screen the articles during each round. The authors compared the results and resolve any discrepancies, ambiguities, or disagreements through discussion until consensus was reached. This process is illustrated in Figure 2. In the first-round abstract and title screening, the inter-rater reliability between the two reviewers was 80 percent. In the second-round full-text screening, the inter-rater reliability between the two reviewers was 82 percent.

Figure 2

A PRISMA flowchart illustrating the screening process. Adapted from Moher et al. (2009).



Notes. ERIC: Education Resources Information Center; EBSCOhost: Academic Search Ultimate.

3.6 Extracting the Data

We created a data extraction protocol and independently extract the data (see Table 4) from the included studies. The data extraction protocol included a list of 15 items, which were categorized into four domains: (1) Details of Publication; (2) Study Profile; (3) Characteristics of Intervention; (4) Participants; and (5) Outcomes.

Inconsistencies and variations in data extraction were discussed until consensus was reached.

Table 4

Non-exhaustive List of Data to Be Extracted from Included Articles

Details of Publication

- Study ID (Author(s), Year of publication)
- Journal name

Study Profile

- Research purpose(s)
- Research approach (e.g., qualitative methods)
- Research design (e.g., phenomenological)
- Theoretical and/or conceptual framework(s)
- Data collected (e.g., interview data)
- Limitations of the study
- Suggestion and strategies for future research

Characteristics of Intervention

- Education level (e.g., elementary education)
- Grade level (e.g., grade nine)
- Discipline
- Instructional design strategies
- Challenges and difficulties encountered

Participants

- Number of participants
- Age range of participants
- Sex/gender of participants

3.7 Analysis and Synthesis

Since the extracted articles were heterogeneous and diverse in research purposes, methodology, and outcomes, we presented the results in a narrative format to illustrate the relationships within and between the studies and their outcomes. We extracted the applied instructional design strategy and categorized the strategy into one of the six instructional principles within the Tomlinson's DIM. Then, we evaluated the evidence-rating level of extracted instructional design strategies through the framework of WWC educational practice guide model to produce recommendations for differentiated instructional practice. Lastly, we concluded the challenges and difficulties that teachers faced and suggested directions for future research.

Chapter 4

4. Findings

4.1 Profiles of Included Studies

A total of 17 studies were included and systematically analyzed in our review (see Appendix). We categorized the research designs based on how the included studies reported their research methods. Qualitative methods were the most popular research approach in the included studies, with almost half of the reviewed studies (*n* = 8; 47%) employing such methods, followed by quantitative methods (*n* = 5; 29%) and mixed methods (*n* = 4; 24%) (Table 5).

The most popular study designs were phenomenological studies (*n* = 5), followed by survey studies (*n* = 4), survey and interview studies (*n* = 3), and critical review studies (*n* = 2) (Table 5).

Interviews (*n* = 9; 53%) were the most common method for collecting data. However, all nine studies using interviews adopted at least one other data collection method. For example, two studies combined interviews and surveys (Zhang, 2017; Wan, 2017); one study combined interviews and questionnaires (Zhang, 2021); one study combined interview, classroom observation, and student shadowing (Chan & Yuen, 2015); and one study combined interviews, classroom observation, and textual analysis (Li & Li, 2020). Test (*n* = 2; 12%), questionnaires (*n* = 2; 12%) and classroom observations (*n* = 2; 12%) were the second most popular data collection methods among these studies. Additionally, data was also collected through surveys (*n* = 1; 6%), and secondary sources (*n* = 1; 6%), including academic papers and official

documents related to the Learning in Regular Classroom (LRC) model (*n* = 1; 6%) (Table 5).

Table 5

Profiles of included studies (n = 17)

Category	n	%
Research approach		
Quantitative	8	47
Qualitative	5	29
Mixed methods	4	24
Research design		
Phenomenological studies	5	29
Survey studies	4	24
Survey and interview studies	3	18
Critical review studies	2	12
Case studies	1	6
Quasi-experiment studies	1	6
Experiment studies	1	6
Not reported	1	6
Data collection		
Interview	9	53
Test	2	12
Questionnaire	2	12
Classroom observation	2	12
Survey	1	6
Secondary source	1	6

Because of the ambiguity and dispute in differentiating and defining theories and concepts, in our review, whether an included study adopted a theoretical/conceptual framework depends on whether this study itself clearly indicated that it adopted a theory or concept. And whether the framework is theoretical or conceptual depends on whether the studies reported it as a theory or concept. For example, Rasheed and Wahid (2018) adopted Tomlinson's Differentiated Instruction Model (DIM) as a theory in their study. However, in one of the included studies in our review, Wan (2017) adopted DIM as a concept. Therefore, in our review, we reported Wan adopted

a conceptual framework of DIM. Of the 17 studies reviewed, 12 studies identified a theoretical/conceptual framework (Table 6). For example, Zhang (2021) adopted gifted theories, and Tam (2009) adopted constructivism as a theoretical framework. Regarding conceptual framework, two studies utilized Tomlinson's differentiated instruction (Dulfer, 2019; Wan, 2017), and two studies utilized Self-regulated Learning (SRL) (Zhang, 2017; Pui, 2017) (Table 6). However, all the other studies utilized different conceptual/theoretical frameworks (Table 6).

Table 6

Characteristics of theoretical and conceptual frameworks (n = 11)

Category	Brief Description	n
Theoretical framework (*n* = 5)		
Gifted theories (Zhang, 2021)	Teachers are an integral part in developing highly able learners, as their perceptions and attitudes influence how they identify and modify the general curriculum and pedagogical strategies for highly able learners.	1 (8%)
Constructivism (Tam, 2009)	Constructivism facilitates individuals to create their own new understandings based upon the interaction of what they know with which they come into contact.	1 (8%)
Learning in Regular Classroom (LRC) model (Deng & Pei, 2009)	LRC programs are not to provide appropriate education to students with special needs but any possible forms of education.	1 (8%)
Expertise reversal effect; Mayers' cognitive theory of multimedia learning; and Morenos' cognitive-affective theory of learning with media (Chiu & Lim, 2020)	● Expertise reversal effects: inappropriate instructional design can have negative effects on students with different levels of expertise. ● Mayer's and Morenos' theory: the cognitive capacity in working memory influences the effectiveness of instructional design.	1 (8%)
Stronge's (2007) teacher effectiveness framework (Grant et al., 2013)	The teacher effectiveness framework explores qualities of effective teachers in the following domains: (1) prerequisites of effective teaching; (2) teacher as a person	1 (8%)

	(3) classroom management; (4) instructional planning; (5) instructional implement; (6) assessment.	
Conceptual framework (*n* = 6)		
Tomlinson's (2001) conceptual framework (Dulfer, 2019; Wan, 2017)	Differentiated instruction addresses how teachers respond to students' diversity in readiness, interest, and learning profile.	2 (17%)
Self-regulated Learning Strategies (Zhang, 2017; Pui, 2017)	Learners could enhance their task success by finding out their strength and weakness, and learn more about themselves through self-evaluation.	2 (17%)
Instructional changes represent alternative modes of instructional practices introduced by teachers in the classroom (Tam, 2009)	Individual-focused instructional practices are designed to help students to accomplish learning tasks independently in class or at home. Whole class instructional practices are interactive learning activities which cater to the learning needs of the class as a group.	1 (8%)
Professional learning communities (PLCs) (Wan, 2020)	PLC means a group of people working together and learning from each other. It is often associated with in-depth, systematic, and collaborative professional development environment.	1 (8%)
Learner expertise(Chiu & Lim, 2020)	Learner expertise should be considered when designing instruction with and without technology	1 (8%)
Adaptive learning (Wang et al., 2020)	Adaptive learning uses various learning algorithms such as artificial intelligence and machine learning to personalize the learning experience.	1 (8%)

4.2. Participant Demographics

There were a total of 3,758 participants (μ = 221; range: 7 - 1,876) (Figure 3), including students, parents, teachers, education assistants, and former teachers/current administrators. Most studies included teachers as participants (*n* = 13), followed by students (*n* = 5), parents (*n* = 2), education administrators (*n* = 2), and education assistants (*n* = 1). Seventeen studies reported the grade level at which their research was conducted. Most of the studies focused on the secondary level (*n* = 7), followed by the primary level (*n* = 7). One study researched both primary and secondary

education. Further, six studies reported the specific grade levels, with grades 11 to 12 (n = 3) being most studied, followed by grades seven to eight (n = 2), and grades three to six (n = 1). While three studies did not report a more localized geographical jurisdiction where data was collected, all the other studies (n = 14) reported the jurisdictions of the participants, with Hong Kong being the most represented (n = 8), followed by Guangzhou (n = 2), Beijing (n = 1), Shanghai (n = 1), Chongqing (n = 1), Shandong (n = 1), and Sichuan (n = 1) (Figure 4).

Figure 3

Number of Participants (N = 3,758; μ = 221; range: 7 - 1,876) in each of the reviewed studies (n = 16). The box and whiskers plot illustrates the median:234; inter-quartile range: 210.

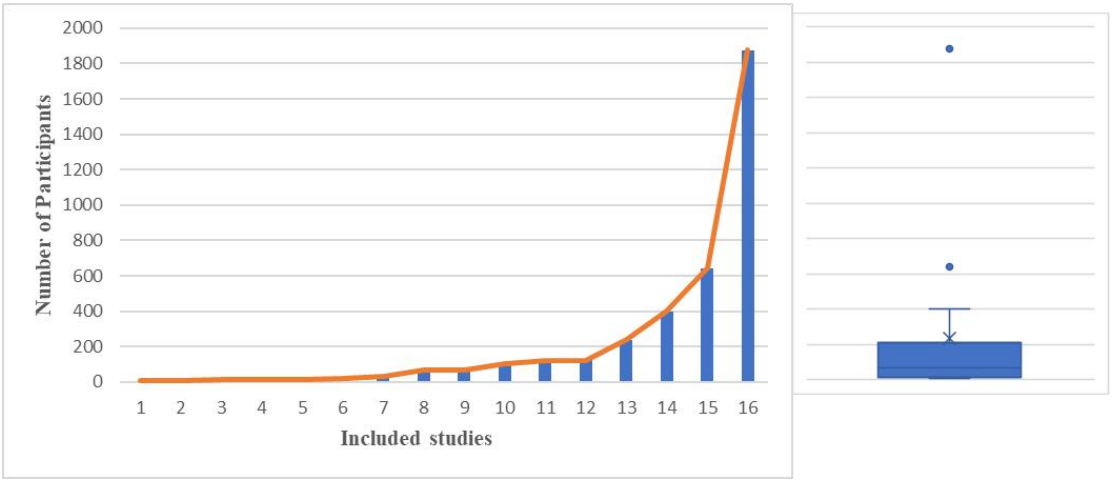


Figure 4

Jurisdictions of Participants.

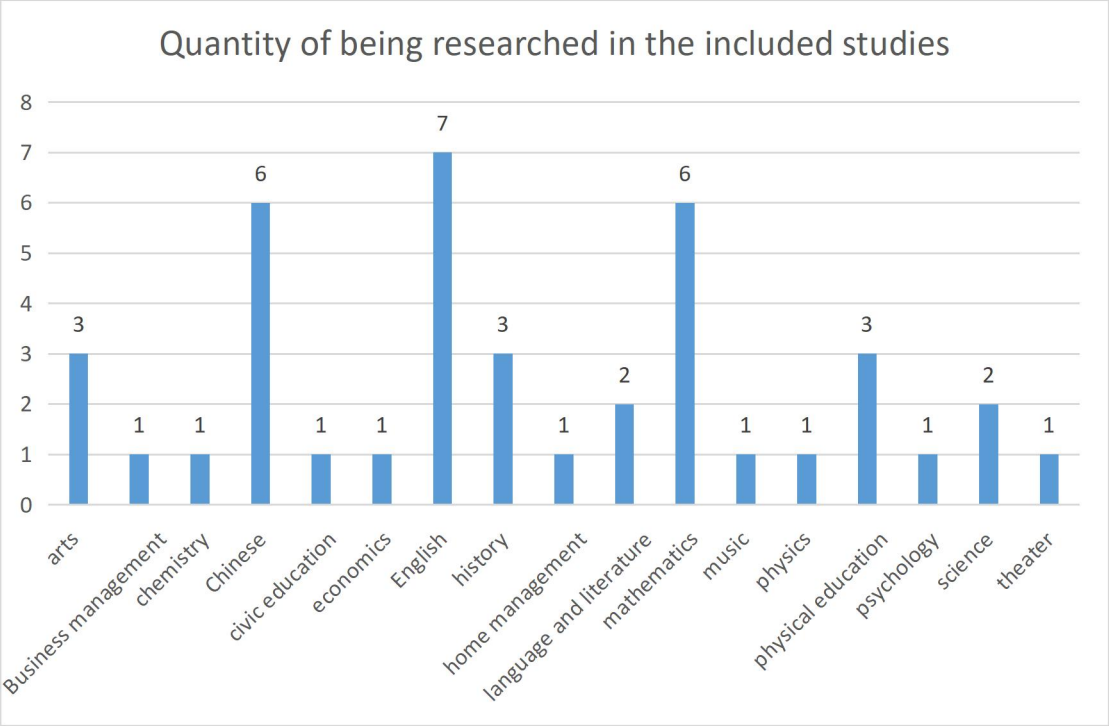
4.3. Characters of Interventions

Of the 17 studies, 15 researched on-site classroom differentiated instructional practice. One study researched online differentiated instructional practice, and one study researched both on-site and online differentiated instructional practice.

Some studies (n = 11) reported the disciplines through which differentiated instruction was offered. A total of seventeen disciplines were reported (Figure 4): arts, business management, chemistry, Chinese, civic education, economics, English, history, home management, language and literature, mathematics, music, physics, physical education, psychology, science, and theater.

Figure 4

Disciplines Distribution in the Differentiated Instruction Studies.



Out of the 17 studies, seven studies researched the differentiated instruction for all students in the regular classroom, and ten studies targeted a specific student group (e.g., students with special education needs, highly able students, and students of ethnic minorities) (Table 7). Among the studies for specific student groups, students with special needs (n = 7), including students with special educational needs (SEN); with various physical special needs, and some of them have mild mental disabilities; disabilities; special needs; specific learning disabilities (SpLD), and developmental disabilities (DDs) were most studied, followed by highly able students (n = 1) and minority ethnic students (n = 1). One study researched differentiated instruction for both gifted education and/or special education.

Table 7

Student groups in DI studies (n = 17)

Category	n	%
All students in regular classroom	**7**	**41**
Students with special needs	**7**	**41**
special educational needs (SEN)	2	12
special need	1	6
specific learning disability (SpLD)	1	6
disabilities	1	6
developmental disabilities (DDs)	1	6
various physical special needs and some of them have mild mental disabilities	1	6
Highly able students	**1**	**6**
Gifted and/or special students	**1**	**6**
Students of ethnic minorities	**1**	**6**

4.4. Instructional Design Strategies with Evidence-level Rating

In this review, the instructional design strategies in differentiated instruction were sorted out into six categories aligned with Tomlinson's (2016) six instructional principles in the Differentiated Instruction Model (DIM). Further, we analyzed the five criteria to rate the evidence level of each instructional design strategy: extent of evidence, effects of outcomes, relevance of scope, relationship between research and the recommendation, and panel confidence. Through analyzing the evidence-level rating of the identified instructional design strategies through the What Works Clearinghouse (WWC) (2020) educational practice guide framework, we were able to present the strong evidence-level, moderate evidence-level, and minimal evidence-level instructional design strategies in the reviewed literature. These findings are discussed below.

4.4.1. Strong Evidence-Level Rating Instructional Design Strategies

A strong evidence-level instructional design strategy must meet all of the following criteria: (1) the strategy was produced in at least two studies and provided a

medium to large extent of evidence[4]; (2) the outcome of the studies that produced the strategy had a preponderance of the evidence of "positive effects"[5] without contradictory of negative effects or potential negative effects; (3) the study had direct relevance to the scope of our review-relevant context, participants, and outcomes of instructional design strategies evaluated; (4) direct test of the instructional design strategy in the studies, or the instructional design strategy was a major component of the intervention tested in the studies; and (5) the panel of reviewers had a high degree of confidence that the practice of the instructional design strategy is effective. There are, in total, four strong evidence-level instructional design strategies produced (Table 8).

Table 8

Strong Evidence-level Instructional Design Strategies

Category of Instructional Principles	Instructional Design Strategies	Student Group
High-Quality Curriculum	**None**	**None**
Continual Assessment	● Modifying assessment methods (e.g., change exam format, allow students to choose test time)	All students
	● Employ self-assessment	All students
Respectful Tasks	● Assigning individualized tasks (e.g., tiered tasks and open-ended tasks)	Highly able students
Building Community	● Invite parents to participate in teacher-parent conferences	All students
Flexible Grouping	**None**	**None**
Teaching Up	**None**	**None**

4.4.1.1 Assessment. Modifying assessment methods was identified in one

[4] A medium to large extent of evidence means that the instructional design strategy was produced in one large-scale study based on a sample of at least 350 individuals or in at least two medium/small-scale studies with a total sample of 350 individuals.

[5] A positive effect of a study refers to when any of the following is true: (1) when the findings of an effect of an instructional design strategy are based on a single study that measured within an instructional design principle, the study reported that effect is positive and statistically significant; or (2) when the findings of an effect of an instructional design strategy were based on multiple studies, at least one main finding is positive and statistically significant.

large-scale study (Zhang, 2017) and four medium/small studies (Chan & Yuen, 2015; Dulfer, 2019; Wan, 2020; Liu et al., 2020) as a positive and effective instructional design strategy in assessment. Modifying assessment methods includes giving students a choice of assessment task type, allowing students to work on their own time, and changing the exam format. This strategy helps students be aware of their strengths and weaknesses and allows them to demonstrate their knowledge comfortably (Chan & Yuen, 2015). For example, students with poor writing skills could finish an oral presentation instead of a written assignment (Chan & Yuen, 2015); students could use laptops instead of paper (Chan & Yuen, 2015); and students could find topics they were interested in exploring and change direction as they needed with the help and guidance of the teacher (Dulfer, 2019), etc. Modifying assessment method could enhance students' agency and situational interest and maintain a level of intrinsic motivation.

Employing self-assessment was another strong evidence-level rating instructional strategy proven in a large-scale study (Zhang, 2017) and a medium/small-scale study (Pui, 2017). Although students did not conduct self-assessment in its full spectrum to involve in setting assessment goals or criteria because the Same Course Content, Differentiated Instruction requires the same objectives for all students, the self-assessment practice afforded them opportunities to use and hone their metacognitive skills. Furthermore, students' improved self-efficacy, and intrinsic motivation may also be explained as a result of self-assessment since it gave students a sense of control and autonomy.

4.4.1.2. Community. Inviting parents to participate in teacher-parent conferences once a semester or on a more-frequent basis was a strong evidence-level rating instructional design strategy identified in a large-scale study (Ding et al., 2006) and a medium/small-scale study (Chan & Yuen, 2015). Teacher-parent conferences could enhance the communication and interaction between parents and teachers, which might help them work together to modify instruction or educational expectations to fit each child's needs (Ding et al., 2006). Moreover, parents should gain access to teachers' extended support for their children's education through the teacher-parent conference (Chan & Yuen, 2015). For example, parents should gain access to know more about their children's occupational development. Meanwhile, teachers should also gain assistance from parents through teacher-parent communication (Chan & Yuen, 2015).

4.4.1.3. Tasks. Assigning individualized tasks was identified as an effective differentiated instruction strategy in one large-scale (Tam, 2009) and five medium/small-scale studies (Zhang, 2017; Wan, 2020; Grant et al., 2013; Pui, 2017; Wan, 2017). Teachers should differ students' assignments based on their individual or group readiness, learning needs, and interest and allow for a wide range of product alternatives (Wan, 2020). Individualized tasks could be realized in tiered tasks and open-ended tasks. Individualized tasks could be received differently by the students so as that they elicit their creative thinking and deep learning (Wan, 2017). Moreover, students with learning problems can experience school success only if teachers are willing and able to change their instructional practices by designing more

individual-focused tasks (Tam, 2009).

4.4.2. Moderate Evidence-level Rating Instructional Design Strategies

A moderate evidence-level instructional design strategy must meet the following criteria: (1) the strategy was produced in at least one study and provided a small extent of evidence[6]; (2) the strategy had a preponderance of the evidence of "positive effects" or "potentially positive effects."[7] Any contradictory negative effects or potential negative effects must be discussed and determined by the panel of reviewers with regard to relevance to the scope; (3) the relevance of the study to the scope of our review might vary, at least some studies are directly relevant to scope; (4) the test of the instructional design strategy in the studies might not be evaluated as a major component of the studies; and (5) the panel of reviewers did not have a high degree of confidence that the practice of the instructional design strategy is effective in most contexts, but is more compelling than a minimal level of evidence. There are, in total, 30 moderate evidence-level instructional design strategies produced (Table 9).

Table 9

Moderate Evidence-level Instructional Design Strategies

Category of Instructional Principles	Instructional Design Strategies	Student Group
High-Quality Curriculum	● Print textbooks in enlarged fonts	Students with SEN (visual disabilities)
	● Make semi-open content	Highly able students
	● Problematize the content	All students
	● Use content-specific technology (e.g. ebooks, videos, and games) and content	Minority ethnic students

[6] A small extent of evidence means that the strategy was not produced in any large-scale study and the total sample of the medium/small-scale studies were fewer than 350 individuals.

[7] A potentially positive effect refers to: (1) when the findings of an effect of an instructional design strategy are based on a single study that measured within an instructional design principle, the study reported that estimated effect is positive and statistically significant; or (2) when the findings of an effect of an instructional design strategy were based on multiple studies, at least one study report the estimation of its main finding is positive and statistically significant.

	neutral technology (e.g., authoring software and mind maps) in lesson and post-lesson activities	
	● Put more emphasis on life skills	Students with SEN
	● Help students to apply knowledge in real world	All students
	● Use mind maps to develop fluency and familiarity with new skills	All students
Continual Assessment	● Use pre-assessment data to differentiate learning experiences	All students
	● Use face-to-face evaluation	All students
	● Give face back to scaffold students' future learning	All students
	● Use both summative and formative evaluation	All students
	● Provide shorter assignment or more time to complete tests	Students with SEN
	● Use peer assessment	All students
Respectful Tasks	● Make tasks based upon the solving of real and relevant problems	All students
Building Community	● Have a professional education assistant	Students with SEN
	● Have a clear policy of differentiation	Students with SEN
	● Enlist the cooperation of parents and communicate with parents who have interest in cooperation	Students with SEN
	● Conduct home visits and hold after-school meetings with parents	Students with SEN
	● Encourage parents to follow up home and Children's Day activities	All students
	● Maintain a central computer register of students' information	Students with SEN
	● Build an IT environment that allows Students to share ideas with teachers	All students
	● Make the classroom environments welcoming and safe	All students
	● Divide rooms into smaller activity areas allowing for different students' self-selected activities	All students
Flexible Grouping	● Use peer-tutoring	Students with SEN
	● Set up interest groups and assign students to different groups	Students with SEN
	● Assign students different roles in group discussion	All students

Teaching Up	● Use one-on-one teaching and peer-mediated teaching	Students with SEN
	● Provide an Individual Education Plan (IEP) for every student	All students
	● Adopt hands-on methods and/or thematic methods	Students with SEN
	● Use technology solutions to provide support	All students

4.4.2.1. Curriculum. Two strategies in Knowledge were identified. First, using visual support such as textbooks printed in enlarged fonts for students with mild visual disabilities was proven to be an effective instructional design strategy in two medium/small-scale studies (Liu et al., 2020; Li & Li, 2020). Students with visual disabilities have the typical cognitive function and oral communication skills as their classmates. Moreover, since this teaching accommodation for students was relatively uncomplicated, this strategy could be a good start to differentiated instruction, and teachers might be more willing to help students with special needs. The second Knowledge instructional design strategy is to make content semi-open to stronger students. This strategy was identified in a medium/small-scale study (Chiu & Lim, 2020). Teachers usually descriptively used the content-specific technologies[8] and told the whole story — from beginning to end and from questions to answers. In other words, teachers often presented the Knowledge in linear form and told students all the facts that they needed for exercises or activities. Teachers can make semi-open content in a non-linear form by presenting some, but not all, of it to academically stronger students.

Three instructional strategies in Understanding were identified. The first one is to

[8] Content-specific technology is a concept coupled with content-neutral technology. Content-specific technology, including ebooks, videos, and games, is the technology that presents subject matter knowledge (Chiu, 2020).

use learning goals as a way of problematizing the curriculum identified in a medium/small-scale study (Dulfer, 2019). Rather than directly delivering the content, problematizing content was to ensure students in the classroom could access and investigate their content independently and therefore take control of their own learning. Problematizing content could help teachers enable students' critical engagement with the course Knowledge. The second instructional design strategy was about the use of technology for cultural knowledge (Chinese, English, and the humanities) identified in one medium/small-scale study (Chiu & Lim, 2020). Content-specific technology, including eBooks, videos, and games, could be more effective in preparing students with weaker relevant cultural backgrounds (e.g., ethnic minority students) for classroom discussion activities. Therefore, weaker students should be allowed to access digital subject content during lessons (Chiu & Lim, 2020). Meanwhile, for students with stronger relevant cultural backgrounds, content-specific technology benefited their Understanding during the reflective process (after-lesson activities). Therefore, teachers should use more homework assignments such as watching videos and reading digital articles, which are more likely to provide students with greater autonomy and thinking spaces (Chiu & Lim, 2020). On the other hand, content-neutral technology[9] (e.g., authoring software, mind maps, and portfolios) could effectively activate the prior knowledge of students with stronger relevant cultural backgrounds and allow them to connect their past experiences to lesson discussion activities (Chiu & Lim, 2020). Teachers should ask stronger students to

[9] Just as mentioned before, content-neutral technology is with content-specific technology. Content-neutral technology includes communication and collaboration tools and web-based digital media which do not directly present factual information but provide platforms for authoring, discussing, and sharing (Chiu, 2020).

prepare the lesson by creating digital content, and this will stimulate their creativity. For students with weaker relevant cultural backgrounds, content-neutral technology could help them reflect, share, and communicate in post-discussion (after-lesson activities). Thus, teachers should encourage weaker relevant cultural-background students to create artifacts with the technology and introduce their own cultures and languages to their classmates to promote cross-cultural experiences. Moreover, for noncultural domain knowledge (mathematics and science), there was no significant difference among students with stronger and weaker relevant cultural backgrounds. Teachers were suggested to use content-specific technology in classroom discussion activities and consolidate their knowledge with content-neutral technology for after-lesson activities (Chiu & Lim, 2020). Thirdly, using a flipped classroom showed promise for students' Understanding. Teachers did not change the content delivered to students but the way they delivered content. They recorded the lesson and broke the recording into flipped videos, which enabled students to take more control of which content they accessed and when they accessed it. Students could watch the familiar material at double speed or slow it down and re-watch the unfamiliar and challenging material. This strategy could allow students to work in their space and allow teachers to differentiate content delivery for students who might be ignored, bored, or out of their pace in their classrooms.

Three instructional design strategies were identified in skills to Do. First, for students with special educational needs (SEN), teachers could offer "alternative routes" to learning and put less emphasis on academic skills and more emphasis on

life skills (Chan & Yuen, 2015). Second, teachers could help students to apply key understandings and skills to areas that they were interested in (Wan, 2017). Third, teachers could use mind maps and work on the platforms like Google Drive to provide students with a secure framework to develop fluency and familiarity with their newly acquired skills (Pui, 2017).

4.4.2.2. Assessment. One moderate evidence-level instructional design strategy was identified for pre-unit assessment. Teachers could use pre-assessment data to differentiate students' learning experiences in accordance with their ability level, interests, and learning styles (Pui, 2017).

Two unit assessment strategies were identified. First, face-to-face evaluation could benefit students (Pui, 2017). Students could clearly and immediately understand teachers' ideas, and they could ask questions and get timely help if they were confused. Moreover, teachers reported that their positive explanation and appreciation comforted students, helped them accept their weaknesses, and motivated them to improve. Second, giving feedback that scaffolded students' future learning was promising (Dulfer, 2019). Teachers felt it very important to provide formative and student-specific scaffolds to support students to reflect and get to the next level.

One strategy in summative/after-unit assessment was identified, which is to use both formative and summative evaluation to determine the student's ability level (Wan, 2017).

Two general assessment strategies were identified. First, for students with SEN, teachers could provide shorter assessments (Li & Li, 2020) or give more time to

complete tests (Chan & Yuen, 2015). Meanwhile, teachers could have different expectations (e.g., lower expectations) for them (Li & Li, 2020). This strategy was the easiest way to differentiate instruction for SEN students in LRC classrooms. Second, peer assessment was another promising strategy. This strategy was identified in a large-scale study (Zhang, 2017). However, because the effectiveness of the strategies was not evaluated, and the author was not firmly confident about the strategy, this strategy was rated as moderate-evidence level. Students who were familiar with assessment criteria could encourage their peers to self-reflect and promote their critical thinking and deep learning.

4.4.2.3. Grouping. Three moderate evidence-level grouping strategies were identified. First, four medium/small-scale studies reported peer-tutoring as effective (Li & Li, 2020; Yuen et al., 2005; Deng & Pei, 2009; Liu et al., 2020). Peer-tutoring was indeed a powerful instructional strategy to develop a student-to-student support network. Moreover, under the current situation where one teacher usually has to teach a large-size class, arranging qualified peers as assistant teachers were proven to be an effective and efficient solution. Students with special educational needs (SEN) were paired with a student who is higher-achieving, helpful, and well-behaved, and these assistant teachers would help them with schoolwork and homework (Yuen et al., 2005). SEN students could adapt better to school life, and, in turn, their peers could develop a sense of mutual help and care and consolidate their course knowledge through tutoring. However, the vast majority of teachers agreed that this method could produce positive outcomes only when it is properly designed by teachers. The second

was to set up interest groups and assign SEN students to different groups (Li & Li, 2020). For example, students with visual disabilities were placed into music groups. This instruction form provided SEN students with an opportunity to communicate and participate in extracurricular activities. Third, during group discussions, teachers could assign students different roles (Pui, 2017). Teachers could target each student's level of learning, strengths, and weakness and then appoint one to a different role as part of a task (Pui, 2017).

4.4.2.4. Community. A total of 8 instructional design strategies in five aspects were identified to build a differentiated community. For personnel to assist, there could be a professional and dedicated education assistant and establish a collaborative-teaching partnership with teachers (co-planning, co-delivering, and co-assessing) (Chan & Yuen, 2015). These assistants provide support for individual students with special needs, including ensuring their safety, comforting their emotions, clarifying the instructions, and interpreting course knowledge. This arrangement could better respond to individual differences and therefore make effective and efficient differentiated instruction.

Having a very clear school policy of differentiation and inclusion is another positive strategy (Chan & Yuen, 2015). Schools could have a clear vision statement to celebrate the diversity in a community. And this policy should be available on the school website and accessible to parents, students, and the public.

Parents should be treated as valued partners in building an inclusive and supportive community. First, teachers could try to enlist the cooperation of parents

and communicate more frequently with those who showed interest in cooperation (Chan & Yuen, 2015). Second, classroom teachers could conduct home visits and hold after-school meetings for individual students with educational needs (Liu et al., 2020). Moreover, besides face-to-face communications, parents could connect with teachers through phone calls and social media networks (e.g., WeChat[10] messaging) to solve students' instant needs (Liu et al., 2020). Third, parents were expected to engage in their child's education on an individual level as well as on a program level (Fees et al., 2014). Parents were encouraged to follow up on home activities and accompany children on community field trips and other Children's Day activities (Fees et al., 2014). Moreover, parents were welcome to serve on parental committees to secure students' safety and plan activities for facilitating partnerships between schools and families (Fees et al., 2014).

Information technology (IT) is a promising tool for differentiated instruction. First, schools could maintain a central computer register of SEN students' information (strengths, weaknesses, and special needs) and keep it regularly updated (Chan & Yuen, 2015). This strategy ensured consistency in the assistance for a student, especially when a student went across different curriculum subjects. Second, an IT environment allowed students to share ideas and learn from teachers and peers (Pui, 2017). Building an IT environment could provide students with a more supportive learning environment.

The classroom environment is very important in building a differentiated

[10] WeChat is an mobile application for instant communication.

community. First, teachers should make the classroom environment welcoming and safe by ensuring respectful teacher-student and student-student relationships. This strategy was identified in two medium/small-scale studies. (Dulfer, 2019; Yuen et al., 2005). And students should be encouraged to demonstrate their understanding and feeling of the classroom environment. Teachers should be prepared to set aside time to listen to talk with students. Second, teachers could divide rooms into smaller activity areas allowing for different students' self-selected activities. This strategy was also identified in two medium/small-scale studies. (Fees et al., 2014; Dulfer, 2019). Teachers should ensure students can make their decisions in their activity areas about how they use and interact in their classroom space. Allowing the students' agency could help create a culture of trust among students and teachers.

4.4.2.5. Teaching. Four moderate evidence-level instructional design strategies were identified in teaching. First, the common differentiated strategy applied by the classroom teachers was one-on-one teaching and peer-mediated teaching (Liu et al., 2020).

Second, teachers could provide every student with an Individual Education Plan (IEP) based on their readiness, interest, and learning profile (Chan & Yuen, 2015). In IEP, teachers should plan activities that necessitate students do something with their prior knowledge. IEP should be annually reviewed and renewed in consultation with the student and their parents.

Third, teachers could adopt hands-on methods and/or thematic methods for special-educational-needs (SEN) students. This strategy was identified in two

medium/small-scale studies (Li & Li, 2020; Fees et al., 2014). Providing direct interaction with teaching materials or letting students actually operate on the teaching materials could allow SEN students to better understand the course knowledge. Thematic teaching methods (e.g., thematic stories) enable SEN students to have contextual interaction with course content.

Fourth, some teachers were using technology solutions to provide support for diverse student needs, while others were not. For example, one teacher used individual whiteboards since students noted that they were more likely to attempt a difficult math question if they could timely rub out mistakes as they went along (Li & Li, 2020). However, for teachers who used content-neutral technology (e.g., online communication platforms), teachers should provide timely aid (Chiu & Lim, 2020). Teachers should give appropriate hints or aids to students with less relevant prior knowledge to avoid meaningless discussion. For example, when discussing a Chinese landmark, students should be provided with aids, including videos about the history of this architecture (Chiu & Lim, 2020). Moreover, teachers were recommended to provide students with different content-levels aids with clear labels. Students should be allowed to choose the labels to help them understand the content they need (Chiu & Lim, 2020).

4.4.2.6. Tasks. One moderate evidence-level strategy was identified, which is to provide opportunities for students to work on tasks based upon the solving of real and relevant problems (Wan, 2017).

4.4.3. Minimal Evidence-level Rating Instructional Design Strategies

An instructional design strategy is categorized to a minimal evidence-level rating when met any of the following criteria: (1) the strategy was not produced in any study that included a participant; (2) the strategy had a weak, negative, uncertain, or contradictory effects; (3) the relevance of study might be out of the scope of our review; (4) the test of the instructional design strategy in the studies might not be evaluated; and (5) the panel of reviewers thought the instructional design strategy must be addressed as a part of the review, but the panel could not point to a context that the strategy could be practice effectively. There are, in total, 14 moderate evidence-level instructional design strategies produced (Table 10).

Table 10

Minimal Evidence-level Instructional Design Strategies

Category of Instructional Principles	Instructional Design Strategies	Student Group
High-Quality Curriculum	● Offer activities to develop students' social competence	All students
Continual Assessment	● Use questions and student responses to explore what students found confusing	All students
	● Make a track system	Students with SEN
Respectful Tasks	● Assign (pre-teach) homework	All students
	● Break tasks down into manageable steps and set up short-term goals	All students
	● Allow SEN students more time to complete their work	All students
Building Community	**None**	**None**
Flexible Grouping	● Make small-group hands-on learning activities that requires engagement and collaboration	All students
	● Use online communication tools to create an "opening" environment for students	All students
Teaching Up	● Develop and test hypotheses and anticipate students' misconceptions	All students
	● Use open-ended instruction	Highly able students
	● Make the lectures mixed with	All students

questioning, students responding, and scaffolding	
● Talking privately with students' classmates	Students with SEN
● Use a reward system to reinforce effort and accomplishments	Students with SEN
● Conduct individual after-school tutoring	Students with SEN

4.4.3.1. Curriculum. There was one minimal evidence-level instructional design strategy identified. For skills to Do in differentiated instruction, teachers could offer more classroom experiences that develop the child's social competence (Fees et al., 2014). For example, rather than only traditionally conceived moral development, teachers could make experiences that would cultivate students' quality, health, personality development, and the ability to love, accept, and tolerate.

4.4.3.2. Assessment. Two minimal evidence-level strategies were identified. For unit assessment, teachers could use questions and student responses to explore what students found confusing or confusing (Grant et al., 2013). By eliciting and interpreting students' ideas, teachers might promptly provide alternative explanations, models, and procedures to represent core course knowledge.

Furthermore, teachers could make a tracking system to respond to SEN students' needs (Deng & Pei, 2009). And the assessment content for SEN students could include:

- Areas of ideology and morals.
- Cultural knowledge.
- Social competency skills.
- Special skills related to their disabilities.

This assessment should be different for general students and thus beneficial for SEN students to enhance their self-confidence.

4.4.3.3. Grouping. Two minimal evidence-level grouping strategies were identified. First, teachers could make hands-on learning activities that require the active engagement and collaboration of the child in small groups (Fees et al., 2014). Second, teachers could use online communication tools (e.g., Google Doc and the collaborative tools within Google Drive) as effective platforms to create an "opening" environment for students to learn from each other (Pui, 2017).

4.4.3.4. Teaching. Seven minimal evidence-level teaching strategies were identified. When making education plans, teachers could develop and test hypotheses about student learning difficulties and anticipate students' misconceptions (Grant et al., 2013). Meanwhile, team planning was another important strategy for teachers in China (Grant et al., 2013). Teachers could exchange ideas and share experiences in teaching to make their differentiated instruction more efficient.

With regarding teaching methods, teachers suggested that open-ended instruction[11] was promising for highly able readers (Zhang, 2021). Highly able readers needed special attention from teachers. And they also needed advanced reading materials, individualized instructions, and more independent and open-ended, and challenging learning opportunities. For general students, teachers suggested making the lectures mixed with questioning, students responding, and scaffolding (Grant et al., 2013).

[11] The definition of open-ended instruction is the instruction with unlimited learning goals, questions, strategies, and final production (Zhang, 2021).

Talking privately with students' classmates to help students with special educational needs (SEN) understand the course knowledge was another promising strategy (Yuen et al., 2005). Moreover, teachers were also suggested to use a reward system to reinforce effort and accomplishments (Yuen et al., 2005). Teachers should not only focus on the students' intellectual capacity or a specific skill but on the child's potential in all areas. Furthermore, teachers were suggested to conduct individual after-school tutoring for SEN students (Deng & Pei, 2009). The teachers arranged tutoring scheduled for SEN students, and the students could catch up with content taught in class that they may not have understood. This strategy could meet SEN students' individual learning needs in a collective atmosphere.

4.4.3.5. Tasks. Three minimal evidence-level task strategies were identified. First, teachers could assign (pre-teach) homework and explain it clearly to increase students' success rate (Yuen et al., 2005). Second, teachers could tell students how to break tasks down into manageable steps and set up short-term goals for them (Yuen et al., 2005). Third, teachers could allow SEN students more time to complete their work (Yuen et al., 2005).

4.5. Challenges and Difficulties Met in Differentiated Instruction

4.5.1. Curriculum

4.5.1.1. Knowledge. First, teachers reported that the lack of clear curriculum standards for SEN students was the primary challenge. Teachers usually met difficulties when setting up educational objectives without a standard (Liu et al., 2020). Second, there were no sufficient teaching materials and differentiated content

for SEN students (Deng & Pei, 2009; Fees et al., 2014; Li & Li, 2020; Liu et al., 2020). Teachers felt that teaching SEN students was like "making bricks without straw." SEN students had to use textbooks identical to students without SEN. The teaching content was mainly about knowledge and skills that typical and average students need to master. Therefore the educational needs of SEN students were rarely met. Third, the research found that data-driven curriculum decision-making was still disconnected from the actual needs of students when it came to practice (Wan, 2020). Fourth, high-stakes tests and a large class size made teachers have no time to differentiate. Six studies (Chan & Yuen, 2015; Deng & Pei, 2009; Dulfer, 2019; Fees et al., 2014; Grant et al., 2013; Yuen et al., 2005) reported the teachers' stress when facing high-stakes testing and a high density of curriculum content. Since the educational system was exam-oriented, teachers often needed to follow a prescribed syllabus and work toward examination. Meanwhile, the system requires a mastery performance in subject matter, and the content demands of the subjects were very heavy. Some teachers felt pressured by the school environment to ensure that students could achieve high grades (Dulfer, 2019). This meant that in order to cover all the course knowledge needed for tests, the classroom time available for pedagogical innovation and student agency was reduced. Five studies (Grant et al., 2013; Liu et al., 2020; Tam, 2009; Wang et al., 2020; Zhang, 2021) reported that a large class size made it difficult for differentiated instruction and forced classroom teachers to adopt highly teacher-centered education. Teachers reported that it was almost impossible to plan differentiated contents and reading activities due to insufficient time and energy

in large-class teaching. Teachers tended to focus their teaching at the level of students with average learning aptitudes and neglected students with learning difficulties and special needs. However, research showed that reducing the class size alone is insufficient to promote differentiated instruction (e.g., Byun, 2014; Zhang & Liu, 2016; Zhang, 2020).

4.5.1.2. Understanding. Research reported that the curriculum content and delivery were mandated by outside personnel, and very limited adjustment was allowed in its delivery (Ding et al., 2006).

4.5.1.3. Skills to Do. Two difficulties were reported for students' skills. First, teachers acknowledged that although students with learning difficulties were encouraged to alternative skills besides academic skills, they needed more time to master their newly-acquired knowledge or skills (Pui, 2017). Second, students were less likely to experience activities to cultivate their leadership (Wan, 2020).

4.5.2. Assessment

4.5.2.1. Unit Assessment. First, since teachers usually provided informational feedback, research (Zhang, 2017) found that teacher feedback did not motivate students. Second, peer assessment was not helpful in studies and had negative consequences (Zhang, 2017). Students were not involved in "genuine" peer assessment. Moreover, because the peers were not reliable, their subjectivity, fairness, and accuracy were of concern. Third, there was no adaptive learning performance assessment for SEN students (Liu et al., 2020). Students with SEN and without SEN were given the same tests. SEN students were not included in the school's evaluation

system despite being placed in regular classrooms. Rather, their progress was recorded and assessed by the classroom teachers or special education teachers alone. The SEN students faced many difficulties in answering the questions in the exams. Teachers had to gradually lower their expectations for SEN students and set lower educational goals when SEN students advanced toward a more difficult level of academic learning. Most schools reported that they could not provide appropriate internal evaluation programs for SEN students due to their limited expertise.

4.5.2.2. After-unit/summative Assessment. Research (Li & Li, 2020) found that the academic performance of SEN students was excluded from the overall performance of the class. Some participants believed that the exclusion of SEN students' performance was the main reason for the lack of school support. This was a compromise that the government imposed to boost the enrolment of SEN students in regular schools. If their academic performance was included in the class ranking, more schools would reject them.

4.5.3. Grouping

4.5.3.1. For Students without Disabilities. First, for students without disabilities (Deng & Pei, 2009), it was common that peer-tutoring became an extra burden. Second, parents of students without disabilities often worried about whether their children's achievement was impeded by their SEN student peers (Li & Li, 2020). In their eyes, SEN students were often associated with low intelligence, and their challenging behaviors would disrupt classroom instruction. Parents were worried about whether their children without disabilities would spend too much time tutoring.

4.5.3.2. For Students with Disabilities. SEN students found difficulties in making friends with peers, and they often felt lonely in regular classes, although teachers deliberately avoided isolation (Deng & Pei, 2009). Moreover, many parents of SEN students were reluctant in developing peers for their child. They often worries about their child's behavioral and emotional problems might be worsen if ill treated by peers who were impatient or lack professional knowledge and skills of meeting the special needs of their child.

4.5.3.3. For Teachers. Teachers reported it was a complex challenge for them to balance students' individual and group needs, especially in a special education context (Pui, 2017).

4.5.4. Community

4.5.4.1. Help from Professional Personnel. First, four studies (Ding et al., 2006; Li & Li, 2020; Liu et al., 2020; Zhang, 2021) reported a lack of professional support from special education teachers and/or education assistants (EAs). What's worse, there were fewer types of personnel supporting classrooms in rural areas. None of the teachers in rural areas in the included studies received assistance from professionals in special education (Li & Li, 2020). Second, even when there were EAs, studies reported a lack of communication between mainstream teachers and EAs (Wan, 2017). EAs pointed out that some teachers did not feel comfortable working with them. And EAs thought mainstream teachers were not really prepared to plan a lesson with them. On the other hand, due to their heavy daily workload, mainstream teachers had difficulty finding a mutually convenient time to plan instructions with EAs (Wan,

2017). Moreover, since the training for EAs did not include lesson planning, the idea of co-planning lessons did not work out effectively. EAs should be able to access the course content and expectation of each lesson before class.

4.5.4.2. Knowledge and Training. First, a lack of understanding of instructional strategies was an obstacle faced by teachers in doing differentiated instruction (DI). Survey data (Ding et al., 2006; Li & Li, 2020; Liu et al., 2020; Wan, 2017) found that few teachers were well-equipped with knowledge and skills in doing DI. Second, teachers expressed concerns regarding the training (Chan & Yuen, 2015; Deng & Pei, 2009; Li & Li, 2020; Zhang, 2021). There was a lack of in-service training for teachers in employing effective strategies to cater to learner diversity. Moreover, the qualification and certification of training seemed not to be attractive to teachers, and schools did not reduce teachers' workload to support teachers when participating in such training (Liu, 2020).

4.5.4.3. Resources. First, little support and few resources were available for both teachers and SEN students in a general classroom (Deng & Pei, 2009; Fees et al., 2014). Second, although urban schools might have EAs, the resource constraints limited the effectiveness of their work (Chan & Yuen, 2015). Part-time EAs did not attend the full curriculum and therefore had to spend extra time familiarizing themselves with missed course content, which at times created a problem in the continuity of support.

4.5.4.4. Financial Support for Teachers. First, special education teachers' salary was usually lower than the average salary of regular education teachers (Ding et al.,

2006; Li & Li, 2020). Second, regular classroom teachers participating in special education had concerns about their pay and workload ((Ding et al., 2006; Li & Li, 2020). Although they invested a great deal of energy and extra time in educating SEN students, their salary only increased slightly. The financial compensation for them was obviously insufficient. The regular classroom teachers were often stressed by the academic performance of students without SEN, which was directly related to their income.

4.5.4.5. Parents. First, some rural parents of SEN students refused to acknowledge that their children had SEN because disability might bring them a strong stigma (Li & Li, 2020). Similarly, urban parents often did not disclose their children's problems when facing the fear of being rejected by the school and teachers (Li & Li, 2020). Second, the communication between the school and the parents of SEN students was limited (Li & Li, 2020; Liu et al., 2020). Especially for rural families, most SEN students in rural areas lived with other relatives, which made it more difficult for teachers to have mutual communication between home and school. Some rural parents of SEN students did not care about students' academic outcomes but were satisfied when inclusive classrooms provided SEN students with a place to stay. Meanwhile, urban teachers also reported poor communication with parents of SEN students. And some urban parents took a "laissez-faire" attitude to their children's education, making teachers' efforts be in vain. Especially when a family had two children, parents tended to put all their energy into the education of the typically developing child. Third, the ability gap between high able poor children and rich

children was widened because rich families were able to afford more after-school learning opportunities.

4.5.4.6. Classroom Environment. First, both the teachers and the schools did not take full advantage of physical elements in the environment to support student learning (Dulfer, 2019). Second, in some studies, teachers were constantly on the move from classroom to classroom (Dulfer, 2019; Tam, 2009). This denied students' desire to study in a set-up environment and take ownership of a room. In some classrooms where teachers always taught in the same space, observational data suggested that the environment was structured with support to differentiated instruction. The display boards were filled with students' work, writing tips, and other learning materials.

4.5.4.7. Institutional Constrains. First, schools were event-oriented (Tam, 2009). School affairs were usually stressful and were tightly controlled to minimize uncertainties. Teachers were given little freedom to decide what they expected and how they did their work. Second, institutional constraints were seen when teachers tried to adopt new instructional strategies in the classroom (Chan & Yuen, 2015). This was one of the major factors to obstruct the sustainability of the new instructional practice. Third, following the increased acceptance of SEN students in class (Liu et al., 2020), there was a large increase in the amount of paperwork for teachers, making them face a heavy workload. The classroom teachers expressed their urgent need for support from school leaders, professional special education teachers, and parental involvement.

4.5.4.8. Policy. First, the urban-rural dual system has greatly influenced differentiated instruction in China and partly enlarged rural-urban disparities (Li & Li, 2020). Second, having equal access to education resources and social life for SEN students was still a radical challenge to Chinese long-held social and educational perspectives (Deng & Pei, 2009). Third, academic achievements were overemphasized since test scores remained the only standard used to assess students' performance and schools' effectiveness (Deng & Pei, 2009). Appraisal of teachers' work was also totally dependent on students' performance in various exams under the current competitive education system. Fourth, teachers expressed their demand with school district offices in charge of special education services to provide support for classroom teachers to meet the SEN students' needs (Liu et al., 2020).

4.5.6. Teaching

4.5.6.1. Teaching Methods. It was apparent that oral presentation by teacher remained the method used in observational data (Chan & Yuen, 2015). Oral presentations could not be adapted to meet all individual differences, and this passive "sit-listen-get" communication style was difficult for SEN students.

4.5.6.2. Workload. Teachers taught an average of 30 - 35 periods per week, so their intensified workload and complexity of the tasks involved did not provide them with sufficient time for planning and making differentiated instruction (Tam, 2009; Li & Li, 2020). In rural areas, there were more other disadvantaged children in the regular classroom. Rural general education teachers were too busy to take care of every student's needs in the class.

4.5.6.3. Students' and Teacher's Emotion. First, for students, teachers remain the "locus of control," the sense of teachers maintaining a strong framing made students feel a lack of choice and agency in some cases (Dulfer, 2019; Liu et al., 2020). For highly able students, they would be disengaged or even be considered as students with bad learning behaviors when left alone (Zhang, 2021). Second, teachers felt powerless and inefficacious when facing numerous challenges and heavy workloads (Liu et al., 2020). Some teachers felt uncomfortable about the use of student-centered approaches to meet students' needs since they needed to take more time in preparation, and its effectiveness was not easily measured. When facing highly able students, teachers held a relatively negative attitude toward their teaching and felt not confident in terms of the role of school education in developing highly able students (Zhang, 2021).

4.5.6.4. Learning Outcome. First, teachers reported that when adopting new modes of instructional practices, there was a high level of learning problems and behavioral problems among students (Tam, 2009). Teachers realized that SEN students had more behavioral problems, and this would affect their instruction. Second, three-fifth of teachers in one study agreed that discrepancy between students made it challenging to guarantee an appropriate instruction for each student (Ding et al., 2006). And findings in one study suggested that despite teachers being willing to adopt new instructional strategies, the whole-class approaches continued to marginalize the students with weaker learning aptitudes (Deng & Pei, 2009).

4.6. Limitations of Included Literature

Twelve studies (71%) reported limitations. The most common limitations were limited generalizability of the findings (n = 8; 67%), a small number of participants in the studies (n = 4; 33%), and studies only focused on a particular point in time (n = 3; 25%). Other reported limitations include potential subjective bias due to most data provided by teachers, the short duration of the studies, all participants being female, failure to capture certain complexities because the study was quantitative in nature, and the potential translation errors in cross-cultural studies.

Chapter 5

5. Discussion

This systematic literature review was conducted to examine the instructional design strategies reported in research literature on China's Same course content, Differentiated instruction educational approach. The purpose of this study was to: (1) systematically review previous studies, analyze the evidence level of the instructional strategies, and summarize these effective strategies into the categories of Tomlinson's six instructional strategies; (2) identify the challenges and difficulties in differentiated instruction (DI). In this chapter, I summarized the the most prominent challenges and difficulties in the Same Course Content, Differentiated Instruction; categorize the effective instructional design strategies; compared Chinese and Canadian differentiated instruction; compared our review with previous systematic review on China's DI; discussed the limitations of the study and future directions for further research; and provide a conclusion for the systematic review.

5.1 The Most Prominent Challenges and Difficulties

5.1.1 Class Size.

In all levels of K-12 education, including kindergarten level, primary level, and secondary level, teachers had to differentiate their instruction in a large class (e.g., Grant et al., 2013; Liu et al., 2020; Tam, 2009). We asserted that the large class size constituted the most prominent challenge for DI. Teachers reported that individual student-focused activities were hardly used in daily teaching when facing more than sixty students in a class.

However, the problem of class size might be alleviated in the near future. There were 207,000 compulsory education (grade 1 to grade 9) schools in 2021, a decrease of 30% compared with 2011 (MOE, 2022a) (Table 11). Meanwhile, there were 10,500,000 full-time compulsory education teachers in 2021, an increase of 15% compared with 2011 (MOE, 2022a) (Table 11). Moreover, there were 158,000,000 compulsory education students in 2021, a decrease of 6% compare with 2011 (MOE, 2022a) (Table 11). The teacher/student ratio already increased 22 percent in 2021 compared to 2011 (Table 11). Qin (2022) reported that in 2020, China's total fertility rate fell below 1.3, far below the warning line of 1.8, which meant that the number of students entering school would keep shrinking in the future. Therefore, we anticipate that with more teachers and few students available in a single classroom, the class size will generally keep shrinking, creating a healthier teacher-student ratio in the future.

Table 11

Schools, Teachers, and Students of Compulsory Education in China

Categories	**2021**	**2011**	**Increase/Decrease (%)**
Schools	207,000	269,100	- 30
Teachers	10,500,000	9,130,000	+ 15
Students	158,000,000	167,480,000	- 6
Teacher/Student Ratio	6.65 %	5.45%	+ 22

5.1.2 The Exam-Oriented Education System

We found that there were deeper reasons that impeded DI. The exam-oriented education system might be another major challenge for teachers to carry out

differentiated teaching (e.g., Chan & Yuen, 2015; Deng & Pei, 2009; Fees et al., 2014). Although the government and schools encouraged teachers to adopt diverse approaches to meet students' individual needs, their teaching effectiveness was still solely evaluated by students' performance in standardized testing. Therefore, the pressure from an examination-driven education system impacted the amount of time available to them to differentiate teaching. However, high-stakes tests constitute the most important approach to guaranteeing China's equality and equity of education. According to China's Ministry of Education (MOE) (2019a, 2019b), a scientific, standardized, and rigorous exam system is the premise and foundation of the equality and equity of education. While teachers complained that the exam-oriented education system brought too many restrictions on DI making and delivery, this system is irreplaceable in China's education system. Therefore, how to balance standardized exam-oriented instruction and diverse differentiated instruction will remain the biggest challenge in DI making in the very long future.

5.1.3. Financial Support for Teachers

Several studies reported financial support for teachers as a major challenge in DI (e.g., Ding et al., 2006; Li & Li, 2020). China's government has put great effort into supporting the development of education. According to MOE (2022b), the proportion of national financial education expenditure in GDP has remained above 4% for ten consecutive years, with average annual growth of 9.7%. Moreover, in 2022, China's State Council issued a policy that the salary income of compulsory education teachers is listed as the necessary expenditure of the government and must not be less than

local civil servants (MOE, 2022c).

However, we found that the salary income of special education teachers was still lower than regular lesson teachers (Li & Li, 2020), and no national-level policy was published to guarantee the promotion of their salary income. Therefore, although the number of teachers in grade education kept growing for ten years, the recruiting of special education teachers has become a serious problem (Li & Li, 2020). MOE (2022b) said that the government would optimize the structure of education investment, strengthen the overall planning of education funds, and integrate and optimize fund use. We suggested that the policymakers could pay more attention to providing financial support to special education teachers.

5.1.4. Resources and Training

Moreover, teachers reported that there were not sufficient resources (e.g., textbooks, teacher-student interactive technologies, and communication technologies) and training to differentiate their teaching (e.g., Deng & Pei, 2009; Fees et al., 2014, Liu, 2020). Teachers reported an urgent need to receive systematic training about the knowledge for DI.

In our study, we assumed that there might be a correlation between training and the number of instructional design strategies applied in the classroom. We found that if teachers did not receive training, some would pour a lot of energy and time into conducting traditional one-on-one tutoring (Liu et al., 2020). On the other hand, if teachers had a good understanding and training on differentiation, they could utilize multiple strategies to differentiate teaching when facing a similar large class (Chiu &

Lim, 2020). We believe that teacher development support, especially training on differentiation knowledge and practice, is very urgent to develop effective DI.

Noticeably, there were very few challenges and difficulties reported in the instructional principles of respectable tasks and flexible grouping. It does not mean that there was no problem in assigning differentiated tasks and grouping students. Conversely, we thought that previous studies did not pay sufficient attention to these fields. When looking at the identified instructional design strategies, we found that only five strategies were adopted in these two fields, respectively. And these strategies were simple and used for a long time, such as setting up interest groups and tiered tasks. These strategies have gone through the test of time and were proven to be effective, but we call for teachers and researchers to produce and adopt more new strategies in tasks and grouping to meet students' diverse needs.

5.2. Effective Instructional Design Strategies with Evidence-level Rating.

In this section, we inductively asserted instructional design strategies in making and delivering DI by analyzing the evidence levels of the identified instructional design strategies in the included literature.

We are delighted to find that the means of differentiated teaching have become richer and more detailed. In early differentiated instruction research (e.g., Yuen et al., 2005; Ding, 2006), only a few instructional design strategies were adopted, within which some were not clearly explicit. For example, Yuen et al. (2005) reported that teachers sometimes give students with SEN extra assistance during the lesson. However, the study did not further explore what the extra assistance was. Ding (2006)

only reported an instructional design strategy, which was holding a regular teacher-parent conference to build a differentiated community. In more recent studies, Chiu and Lim (2020) thoroughly researched the nuances in how content-specific technology and content-neutral technology functioned differently in teaching cultural-relevant knowledge and non-cultural domain knowledge. And Wang et al. (2020) adopted an AI learning platform to carry out differentiated instruction. We assume that the AI learning platform and the adaptive learning system have great potential for developing effective Same Course Content, Differentiated Instruction. Especially during the pandemic time, the AI adaptive learning system provided students with an asynchronous learning opportunity that students could review the same knowledge multiple times and experience diverse teaching approaches that match their preferences and interests.

Despite the fact that more instructional design strategies were produced and adopted, we assert that the traditional differentiation instructional design strategies still constituted all the strong evidence-level strategies and most medium evidence-level strategies. These strategies include modifying assessment methods for SEN students (e.g., Zhang, 2017; Chan & Yuen, 2015), holding regular teacher-parent conferences (Chan & Yuen, 2015; Ding et al., 2006), and assigning individualized tasks for SEN students (e.g., Tam, 2009; Wan, 2020), which was employed even before the New Curriculum Reform in 2001. However, it was noticeable that the resource gaps between the rural and urban dual education system still existed, and the teachers in rural areas reported the problem of insufficient resources brought them

difficulties in carrying out the aforementioned traditional and basic instructional design strategies (Li & Li, 2020).

It is worth pointing out that even though some strategies were categorized as medium or even minimal evidence-level, it does not mean that these strategies were not as valuable as strong evidence-level strategies. Various reasons could result in the strategies not being strong, including the participant size was not big enough, the authors were not confident about the effectiveness of the instructional design strategy, or the effectiveness of the instruction design strategy was not tested in the study. Teachers and researchers are welcome to trial these medium/minimal evidence level strategies in their course design and differentiation studies. We thought that many medium/minimal evidence-level strategies were very creative and easy to operate. For example, peer tutoring might help students with SEN have a better understanding of the course knowledge and also make friends with their peers. Both studies (Deng & Pei, 2009, Li & Li, 2020) employed peer tutoring to facilitate the instruction for students with SEN. Both studies reported elaborately pairing students without SEN with students with SEN and made a schedule for collaboration that could benefit students on both sides. Students without SEN could develop a sense of mutual help and care and reinforce their classroom knowledge through tutoring. Students with SEN could better participate in the interactive learning process. However, our reviewers believed that it can be extended as a promising instructional design strategy for highly able students. For the highly able students, acting as a peer tutor might help them hone their communication skills and bring them a feeling of being noticed,

which was reported as a challenging point for teachers (Zhang, 2021). Moreover, DI researchers and in-service educators are encouraged to take further studies on testing the effectiveness and efficiency of these promising medium/minimal instructional design strategies.

5.3. Similarities and Differences Characteristics between Chinese and Western Differentiated Instruction

Our study conducted a very simple comparison among DI practice in China and West and found several interesting similarities and differences in the following part. We suggested that future studies could take a deeper and more thorough comparative analysis to gain a more comprehensive understanding among DI practice in China and West.

5.3.1. Class Size

While China's class size usually exceeds 60 people in primary and secondary education, we found that the class size in a western context was much smaller, usually ranging from 20 to 24 people per class in secondary education (Karst et al., 2022). The class size may not be the most prominent challenge for DI in western education. However, several studies still reported class size (Brevik et al., 2018; Scarparolo & Subban, 2021) as a challenging point, indicating that reducing class size may not guarantee sufficient time for teachers to meet all individual students' diverse needs.

5.3.2. Barriers to Teacher Change

There are several common challenges and difficulties for Chinese and Western teachers to carry out DI. For example, teachers in both sides reported that the unclear

goals for differentiation, irrelevant materials and resources, and insufficient time impeded their differentiation practice (e.g., Karst et al., 2022; Zhang, 2020). However, few western systematic reviews reported a lack of financial support and knowledge of differentiation as a major problem in western education. Rather, western teachers were concerned about the fidelity of the institution, meaning whether they could receive firmly and continuously support from their schools (Bondie et al., 2019). We assume that western teachers have generally received the knowledge and training of differentiation and developed their own philosophies of differentiation. We believe that although many Chinese teachers are willing to carry out DI, there is an urgent need to offer systematic and professional training about what differentiation is and how to carry out DI effectively. It is worthwhile to first set up a training mechanism and then consolidate the training along a continuum to increase the use of differentiation and promote teachers' professional development.

5.3.3. The Grouping Strategy

Teacher grouping of students was reported as one of the most common differentiated practices in Western education (Bondie et al., 2019). There was a clear difference between Chinese and Western teaching in carrying differentiated grouping. Chinese teachers usually adopted peer-tutoring as a grouping strategy, letting the regular and highly able students facilitate the students with SEN as a role of teaching assistant. However, Western teachers usually adopted a physical change in seating arrangement from sitting in a whole group to small groups. Students in small groups were expected to finish a task collaboratively. Moreover, one study grouped students

by their thinking styles (Pitts, 2009). Pitts encouraged teachers to divide students' thinking style into global thinking or analytic thinking and respond to students with feedback based on their different thinking style.

We can conclude that the Chinese and western teachers adopted different means to group students. In differentiated instructional design strategy, Chinese teachers actively viewed regular and highly able students as teachers' peers and assistants to offer communication and help to students with SEN, while western teachers adopted diverse strategies to group students based on their group work or their learning preference. It is valuable to note that Bondie et al. (2019) emphasized that studies were not specific about how western teachers' instruction changed within small groups and whether teachers' biases might impact students' cooperation and achievement within the group.

5.4. The Gaps of DI Practice and Researches in China's Rural and Urban Areas

We realized an imbalanced proportion in the locations that produced DI studies in China. Among the 14 studies that reported jurisdictions of the participants, only two studies were not conducted in an eastern well-developed big city (Li & Li, 2020; Wang et al., 2020). We assumed two reasons that might explain the situation. The first reason might relate to one of the limitations of our review - we only searched the literature written in the English language. In our pre-search, we found 3,359 Chinese-language studies focused on the topic of Same Course Content, Differentiated Instruction in CNKI, one of the major Chinese-language academic databases. If we could extend our search into two languages, we might identify more

studies focusing on the DI practice in disadvantaged central and western China. Second, we assumed that there is a need to conduct more studies focusing on the DI practice in disadvantaged central and western China. In the last 20 years, the urbanization rate in China has increased from 36% to 64% (Yu, 2022), showing large rural-to-urban immigration happening in China. Unfortunately, our reviewers could not find more recent data about the trailing[12] and left-behind rate[13] in China. According to the data in 2014, we realized that the left-behind rate was 38.42%, meaning that more than 60 million children were left behind in rural areas (MOE, 2016). In our included literature, only one study focused on the rural-urban disparities in China (Li & Li, 2020), and one planned to extend their studies into rural-urban comparison (Fees et al., 2014). We encourage educators and education research to conduct more researching to address the urgent need for DI for the 60 million left-behind children.

5.5. A Comparison to the Previous Western DI Systematic Review

We briefly compared to a previous systematic review of DI in a western context (Smale-Jacobse et al., 2019). We could learn from this review to extend our review and make our review stronger in the following points. First, this review searched the literature in two languages: English and Dutch. We could extend our review to search literature written in a language other than English. Second, this review clearly defined of terms used in its inclusion and exclusion criteria. For example, this study had a clear definition of "within-class differentiated instruction," which reduced the

[12] The trailing rate means the rate that the children following their parents entering the cities.
[13] The left-behind rate means the rate that children being left in the rural areas

ambiguity for audiences.

And we thought our systematic review did some complementary works. First, in its search-term part, Smale-Jacobse et al.'s review only mentioned that a set of keywords were used. The study did not state explicitly what the search terms were employed, which might make the study less systematic and transparent. In our study, we listed all the used search terms, making our review more systematic and reproducible. Second, Smale-Jacobse et al.'s review adopted Cohen's d to measure the cognitive differences among studies. This approach limited the search to quantitative studies and similar studies that were able to be analyzed through Cohen's d. In our study, we adopted the WWC (2020) evidence-level rating framework. This framework was used in more than 20 published systematic reviews, which proved to be a very powerful and mature approach. Moreover, this framework did not exclude the qualitative studies and studies with differences, which allowed a larger extent of the search of the literature and reduced the potential biases because of the exclusion of qualitative studies.

5.6. A Comparison to the Previous China's DI Systematic Review

We identified a systematic review of China's DI conduct by Bi et al. (2021). We found several common points between Bi et al.'s reviews and ours. First, both reviews adopted Tomlinson's (2016) construct of DI. Second, both reviews found that China's DI was developed in a large size classroom.

Our review made several complements to Bi et al.'s research. First, Bi et al.'s review was conducted on the literature written in the Chinese language. Our review,

therefore, provided the educators and researchers with an understanding of China's DI studies written in the English language. Interestingly, while Bi et al. concluded that Chinese scholars preferred "conceptual research" more than empirical research, our review found that only one study in the 17 included literature did not include participants. Second, while Bi et al.'s review focused more on establishing a general understanding of China's DI, our research complements their research on what specific instructional design strategies were adopted in the previous literature, which might provide the teachers with more direct references and guidance in DI practice.

5.7. Limitations and Future Directions

It is acknowledged that our systematic review has some limitations. We developed well-defined inclusion criteria with the guidance of a professional academic librarian who has extensive expertise in differentiated education, and we collectively trialed different search terms to see if additional relevant studies could be identified. For example, we adopted terms and their synonyms, including "adaptive learning," "differentiated curriculum," and "individualized learning." The inclusion criteria and search terms implemented in the review, however, may still be too limiting to include all relevant literature. Since DI is a construct in inclusive instruction (Scarparolo & Subban, 2021), there might be some relevant DI studies being excluded because they adopted alternative terms within the field of inclusive practice. Accordingly, future research should expand the search terms to find more relevant literature.

Further, we only included English articles as targeted literature for two reasons.

First, the Western University library does not have official access to Chinese-language databases. Although we found feasible research literature on DI written in Chinese in our pre-search, we decided not to take a risk accessing non-English databases without guidance from our librarian. Second, only one author in our research group, HF, uses Mandarin as his native language. Since there is no linguistic expert in our research group, the credit and consistency of translations cannot be guaranteed. Accordingly, it is valuable for future studies to collaborate with researchers who have official access to Chinese-language databases and have expertise in cross-language work. Moreover, it is promising for future studies to adopt multiple-language search to broaden the scope of literature.

In addition, we only included peer-reviewed journal articles in our review due to a time constraint. Future research can search for more types of studies to find high quality and relevant literature, including journal articles that were not peer-reviewed, conference papers, gray literature, and technical reports.

For researchers and educators who are interested in empirical DI research, we suggested that future studies can conduct research to analyze the effectiveness of these moderate/minimal evidence level strategies. Many promising strategies were categorized into moderate or minimal levels because either the strategies just emerged and studies had no time to verify their effectiveness, or the studies focused on a small number of participants. If future studies could test these strategies in larger participant groups from different contexts, there might produce more strong evidence-level strategies to better guide the in-service teachers.

Lastly, in our pre-search, we found several valuable DI studies written in the context of the Taiwan region. However, with our review going deeper, we realized that since the Taiwan region and Mainland China, Hong Kong, and Macao are currently affiliated with the different authorities of education, there would be consistency problems if we continued to review these studies together. For example, we found literature in Taiwan that studied the differentiation under the policy of non-main subject mixed-age teaching (Chen, 2018), which was not employed in mainland China. Therefore, literature written in the Taiwan region was excluded from our review. Accordingly, future research can conduct a comparative review between these two counterparts to see how DI was similarly and differently practiced. For literature on Macao and Hong Kong, although these two special administration regions have the right to make their own education policy, we found policies and documents showing the connection and consistency between the central government and Macao and Hong Kong (MOE, 2019c). Therefore, we thought the literature in mainland China, Hong Kong, and Macao could be studied together. In fact, we did not include any literature studied in Macao's context.

5.8. Conclusion

This research was a systematic review of 17 studies to identify effective differentiated instructional design strategies and existing challenges and difficulties in promoting the efficiency and effectiveness of differentiated teaching. The authors reached and maintained high inter-rater reliability when we screened and extracted data so that our research had a high validity. The purpose of our study was to provide

guidance to the in-service and pre-service teachers in making and delivering DI and a reference to researchers and policymakers to build a clear framework for offering support to effective differentiation.

DI in China has been developing since the 2001 Basic Education New Curriculum Reform. In 2021, China's MOE published the "double-reduction" policy, meaning to ease the burden of (1) excessive homework; and (2) off-campus tutoring for students undergoing compulsory education. This policy requires that the daily after-lesson assignments should not take more than 60 minutes for primary-school students and 90 minutes for junior middle-schools students to finish. This policy also requires lesson teachers to provide after-lesson services and implement various after-school education activities to meet the diverse learning needs of students in the school. Moreover, this policy requires parents to actively communicate with children and guide students to complete their remaining homework, carry out appropriate physical exercise, and engage in housework and family and school activities. With the implementation of this policy, there will be a more solid need for teachers and parents to collaboratively and interactively engage in making and delivering DI to meet students' diverse needs.

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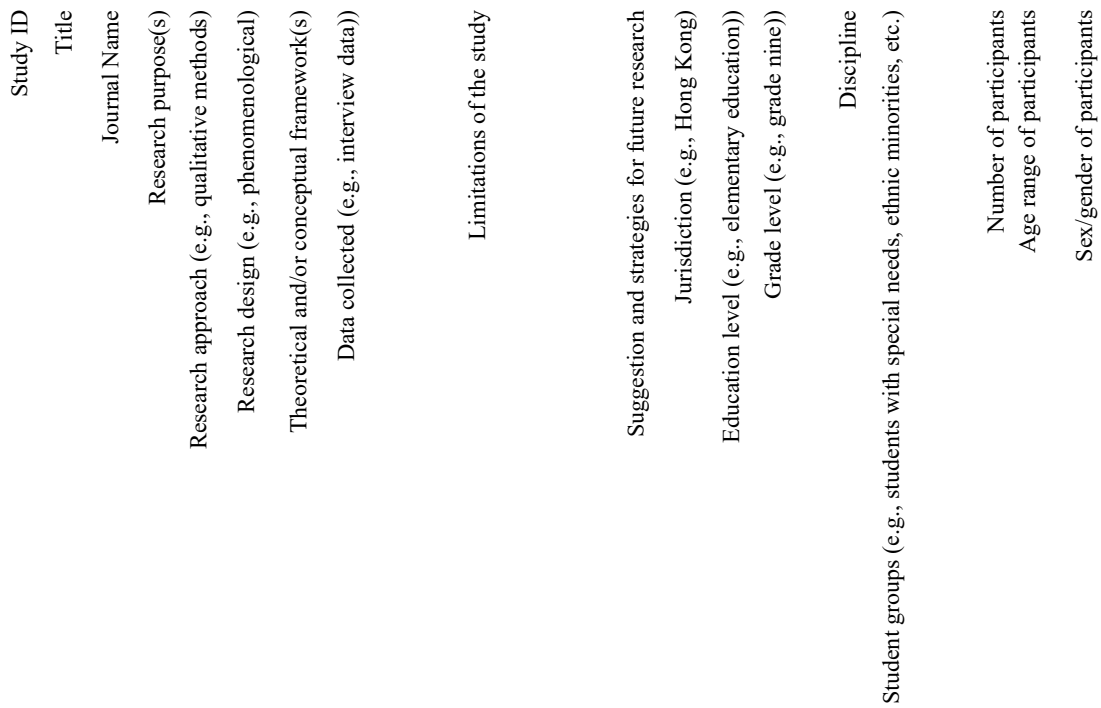
Appendices

Included Literature General Characteristics Data



Chan & Yuen, 2015

Inclusive education in an international school: A case study from Hong Kong

International Journal of Special Education

implementing inclusive education principles.

Qualitative

N/A

N/A

13 Semi-structured interview data; 12 classroom observations; student shadowing

N/A

Future research should investigate policies, practices, and problems associated with inclusive education in other local secondary schools and colleges in Hong Kong. The teacher education courses need to move beyond the rhetoric associated with the idea of inclusion, and deal actively with the "how to" aspect.

Hong Kong

secondary education

Grades 7 to 13

PE, History, Art, and English

Students with special educational need (SEN)

13; school management team (2), education assistants (2), mainstream subject-specialist teachers (4); students with special educational needs (SEN; 2), students without SEN (2), and parents of students with SEN (1).

N/A

N/A

Wenxiao, 2017

Using classroom assessment to promote self-regulated learning and the factors influencing its (in)effectiveness

Frontiers of Education in China

and further explored factors that influenced the effect.

mixed method

survey and interview

Conceptual framework: self-regulated learning and classroom assessment

second research question: using interview data (qualitative)

intentionally solicited in the interview.

3. some of the SEM regression coefficients were over or approaching 1 . Albeit this is justifiable (Joreskog, 1999), over complex models should be used with caution as they are prone to statistical controversy.

preliminary.

3. this study explored the influencing factors qualitatively, such that quantitative research is needed to establish their “mediating” or “moderating” role in the impact of CA on SRL

4. with the unveiled influencing factors, some interventional research could be a next step.

N/A

senior secondary education

grade 11

N/A

N/A

twelve Year-Two (grade 11) teachers and 630 students, with 12 teachers and 59 students participated in interview

N/A

N/A

Li & Li, 2020

system perspective

International Journal of Inclusive Education

general education teachers' inclusive instruction.

Qualitative methods

phenomenological method

N/A

semi-structured interviews, classroom observations, and textual analysis,

N/A

2. in terms of evaluation content, academic evaluation should be combined with other abilities (such as social and communication skills).

3. the evaluation method should not be limited to paper tests, portfolio, checklist, and performance assessment should also be applied

Chongqing

primary education

01-Apr

Chinese, Math, English, Civic Education, Arts, PE

students with special educational needs (SEN)

16 general education teachers in rural and urban inclusive classrooms in China

N/A

all female

Zhang, 2021

Meeting the needs of highly able readers in the primary classroom: teachers' perceptions in China and Scotland

Educational Review

education in the educational contexts of China and Scotland

qualitative methods

questionnaire and interview

theoretical framework: gifted theories

semi-structured interviews and open-ended questionnaire data

differences were inevitable and this might influence the reliability of comparison of the results.

4. there might be the Hawthorne Effect with which participants might change their thinking and behaviours to meet the expectations of the researcher

such as private primary schools and provide generalisable findings for how teachers conceptualise highly able readers in China

3. inclusion of the voices of parents, highly able children themselves and their peers could provide more complete perceptions of highly able children.

Guangzhou

primary education

N/A

literacy

highly able readers

65 Chinese teachers completed the questionnaire, 7 of whom interviewed

N/A

N/A

	Dulfer, 2019
	Differentiation in the International Baccalaureate Diploma Programme
	Journal of Research in International Education
	(2) What factors inhibit or enable differentiation in their classrooms?
	Mixed methods
	multiple case study
	Tomlinson's (2001) conceptual framework
	pre-visit surveys, lesson observations, and post-observation interviews
	N/A
	N/A
	Hong Kong
	International Baccalaureate Diploma Programme
	grade 11 to 12
	One of each: English Literature, History, Bus Management, Psychology, English B, Economics, Theatre, Language and Literature, and History
	Students in the last two years of senior secondary education
	9 teachers
	25-54
	7 females and 2 males

Yuen et al., 2005	from Primary School Teachers in Hong Kong	The International Journal of Special Education	specific learning disability (SpLD) in their classes.	Mixed methods	Survey	N/A	Learning Difficulties (TSSLD) questionnaire	(2) The use of a questionnaire with teaching and management strategies already listed is problematic. For example, there may be a temptation for teachers to indicate in such a list that they do use a certain range of adaptive strategies sometimes, when in fact they do not use them at all. The extent to which teachers do really adapt to individual student differences can only be determined by direct observation in classrooms over a reasonable period of time. Future research might also obtain information from the students themselves to discover what type of help they think they need, and the extent to which they do (or do not) receive it.	Hong Kong	Primary education	grade 3 to 6	Chinese, English, Mathematics	students with specific learning disability (SpLD)	34 primary-school teachers	N/A	N/A

Tam, 2009

Sufficient Conditions for Sustainable Instructional Changes in the Classroom: The Case of Hong Kong

Journal of Educational Change

instructional changes sustainable

Quantitative methods

cross-sectional survey

Theory: Constructivism

survey data

5. the present study uses a cross-sectional survey method to study the constraints that impede sustainability of teaching practices, but has neglected other methods of investigation.

1. There are psychological defenses underneath the various constraints, more in-depth investigations employing qualitative approaches may be necessary to probe the psychodynamic of the school organization and the classrooms.

Hong Kong

junior secondary education

Secondary one and Secondary Two (grade 7-8)

225 (12%) taught personal, social and humanities subjects, and the remainder were mainly arts, music, home management and physical education teachers.

General; not specific

1,876 junior secondary teachers

average age of the teachers was 35.6 years and their average teaching experience was 14.5 years.

730 (38.9%) were male and 1,146 (61.1%) female.

Wan, 2020

Differentiated Instruction Practice

ECNU Review of Education

(3) Is there any relationship between teachers' PLC engagement profiles and DI practice?

Quantitative

Survey

Conceptual framework: Professional learning communities (PLCs)

survey data

1. the sampling size was relatively small and only subsidized schools were included

2. the study was quantitative in nature and may have failed to capture certain complexities underlying the teachers' responses

planning) and how such participations support their differentiated teaching.

(3) Additional research methods such as observation and interviews should be utilized to examine teachers' views regarding PLC engagement as well as their DI practice.

Hong Kong

primary education

N/A

N/A

N/A

121 teachers

N/A

N/A

Ding et al., 2006

China--An Empirical and Sociocultural Approach

INTERNATIONAL JOURNAL OF SPECIAL EDUCATION

Republic of China

quantitative method

Critical reviews

N/A

questionnaire data

the City of Beijing in China. It is unknown whether the characteristics of parents and special education teachers from this region might be shared by samples from other regions in China. Thus the generalization of these findings to other areas in China should be done with caution.

(1) Future research should explore the perspectives of Chinese parents and special education teachers in other urban and rural areas as well.

Beijing

N/A

N/A

N/A

parents of students with disabilities and voluntary special education teachers

400 parents of students with disabilities; 344 questionnaires of the 400 sent were identified as valid. 103 voluntary special education teachers; 100 out of 103 questionnaires were identified as valid.

N/A

N/A

Deng & Pei, 2009													
Barriers													
Asia Pacific Education Review													
2. and the status quo is critiqued and conclusion is drawn accordingly													
Qualitative methods													
Critical analysis													
Theoretical framework: Learning in Regular Classroom (LRC) model													
secondary	data	sources	including	academic	papers	and official documents related to the LRC model.							
N/A													
N/A													
China													
N/A													
N/A													
N/A													
Students with special needs													
N/A													
N/A													
N/A													

Liu et al., 2020

Experiences of Chinese Classroom Teachers

International Journal of Developmental Disabilities

(3) examine the challenges of teachers' implementation of academic support.

qualitative research design

phenomenological

N/A

focus groups, individual interviews, and a review of Individualized Education Programs (IEPs).

progress of teaching, and these students must be sent to schools that provide special education. However, when they were working in specially resourced classrooms, they felt that support must be provided to students with special needs to facilitate their inclusion into the general classroom.

2. Future studies are encouraged to adopt an on-spot observation method for further data collection.

3. future research on this subject must approach the problems from multiple perspectives

4. future research should look more into Chinese classroom teachers' effective use of classroom-wide supports to all students.

Shanghai

elementary education

02-May

Chinese, Mathematics, and English

students with developmental disabilities (DDs)

19 classroom teachers

N/A

female (all)

Fees et al., 2014

in a University-Affiliated Program

International Journal of Early Childhood

China?

Qualitative methods

Phenomenological approach

Not reported

semi-structured focus-group

2. The research design did not include systematic observations of teacher behaviors to compare teacher perceptions with practice.

3. There is an inherent challenge of dependency in cross-cultural work that relies solely on translation.

2. Further research is essential to replicate and expand on these findings through structured interviews and observations in these additional settings.

3. Replicating this study with a classroom observation would allow further triangulation of data sources.

Guangzhou

Kindergarten education

kindergarten

N/A

Kindergarten students

Eight master teachers and former teachers/current administrators

N/A

all female

Chiu & Lim, 2020

Strategic Use of Technology for Inclusive Education in Hong Kong: A Content-Level Perspective

ECNU Review of Education

mathematics (noncultural domain knowledge, e.g., fact and rules).

Quantitative

Experimental

multimedia learning; c. Morenos' cognitive-affective theory of learning with media

students performance level in pretests and posttests

A. Like many empirical studies, the findings of this study have limited generalizability.

B. our study focused on a particular point in time;

C. we did not measure the ongoing learning process.

C. further research should be carried out to investigate how technology influences the effectiveness of different learning tasks other than classroom discussions.

D. Future research is needed to investigate how ethnic background as part of learner expertise affects the other assumptions of cognitive learning theories.

Hong Kong

junior secondary education

N/A

Chinese language and Mathematics

Ethnic minorities

121

11–14 years

60% of them were boys

Grant et al., 2013

United States and China

Educational Assessment, Evaluation and Accountability

3. What are the similarities and differences in professional thinking between teachers in the US and China?

qualitative methods

phenomenological

Theoretical framework: Stronge's (2007) teacher effectiveness framework

semi-structured interviews, classroom observations, and artifacts

to find excellent teachers.

2. Accepting national award-winning teachers as excellent teachers is not a proof-perfect process.

3. Heterogeneity can be a concern because individual cases are so different from each other.

Not reported

China

elementary and secondary education

N/A

5 math, 4 science, and 7 language teachers

16

N/A

6 male and 10 female

Pui, 2017

Difficulties with Self-regulated Learning Strategies.

Support for Learning

self-awareness and also improving students' learning behaviours.

qualitative

participatory action research

Conceptual framework: Self-regulated Learning Strategies

parents' questionnaires and review documents.

N/A

1. we have to be careful in balancing generic skills and subject knowledge teaching.

2. it is worth developing my study to explore different kinds of SRL strategies specifically – do different students with learning difficulties gain benefits from similar strategies, or do different students require different strategies?

Hong Kong

Senior secondary education

form 5 (grade 12)

Chinese and Liberal Studies lessons

various physical special needs and some of them have mild mental disabilities

2 subject teachers and 5 students

N/A

N/A

Wang et al., 2020

instruction.

Interactive Learning Environments

(e.g. class size = 3)?

Quantitative

quasi-experiment

Conceptual framework: adaptive learning

pre-test, post-test

eliminating dosage as an alternative explanation.

3. the present studies were limited to the use of Squirrel AI Learning, which may use unique algorithms and features (Li et al., 2018).

3. Further research is warranted to examine the efficacy of the Squirrel AI Learning system for other grade levels, mathematical topics, and academic areas, and in comparison with other adaptive learning products.

4. More research is needed to understand Squirrel AI Learning's efficacy for introducing new content;

5. more research is needed to understand whether other adaptive learning products are effective in this context

Study 2: a major city in Shandong

Junior secondary education

8

mathematics, English, physics, Chinese, and chemistry

all students in regular classroom

study 1: 155 students

study 2: 84 students

13-15

N/A

Wan, 2017

Differentiated instruction: are Hong Kong in-service teachers ready?

Teachers and Teaching

(2) What obstacles do teachers encounter when doing DI?

exploratory mixed methods

Survey and focus group

concept: Differentiated instruction

survey data and one focus group interview

1. There is a small number of participants in the study.
2. This study is not supposed to be generalised to other schools or countries.
3. This study has not taken other contextual factors into account.

different levels within one school context, for example, curriculum planning and management, teacher development, as well as classroom teaching.

3. follow-up studies can be done in investigating the relationships between teachers' readiness and contextual factors including school climate, leadership, and so forth.

Hong Kong

primary education

N/A

N/A

gifted education and/or special education

Phase 1: 69 in-service teachers for survey data; focus group interview with three teachers

Phase 2: focus group interview with three teachers

N/A

Interview: Unknown

Instructional Design Strategies Data

Study ID	Instructional design strategies
Chan & Yuen, 2015	(1) To provide extra in-class support. (2) To modify (e.g., reduce or simplify) mainstream content. Similarly, to offer alternative routes to learning that put less emphasis on academic skills and more emphasis on life skills. (3) To personify assessment. For instance, for internal formative assessments, students can be given choice of assignments that they feel would allow them to demonstrate their knowledge in a certain subject (e.g., oral presentation instead of written assignment for a student with poor writing skills). (4) To provide students with SEN more time to complete tests, if and when standard examinations are necessary. (5) If and when standard examinations are necessary, allow students to use whatever method they prefer to compete the exam (e.g., laptops instead of paper; reading questions aloud, etc.).

(6) To establish partnerships between a dedicated education assistants (SEN specialists) and the teacher for collaborative teaching (co-planning, co-delivering, and co-assessing). This arrangement enables carrying out differentiation and responding to individual differences. These assistants provide support for individual students, including ensuring their safety, giving encouragement, providing clarification of instructions, and interpreting course content.

The following are not an instructional strategies, but should be noted as general school policies. (1) To have a very clear policy of inclusion in its vision statement-namely "to celebrate diversity in an inclusive and supportive international community." This should be readily available on the school website for access by parents, students, and members of the public. (2) To maintain central computer register of information about all students with SEN (student s strengths, weaknesses and special needs) that is regularly updated. This process ensures consistency in the assistance provided for a student across different curriculum subjects. (3) To treat parents of students of SEN as valued partners, including inviting them to attend school meetings, particularly for discussing IEPs and evaluating their child s progress. This involvement enables the school to provide more personalized education suiting the needs of students with SEN. (4) To provide every student with an Individual Education Plan (IEP), based on learning needs, interests and strengths. IEPs should be reviewed annually in consultation with the student and their parents. (5) Findings revealed that the school has achieved success in raising awareness of all staff on the principles of inclusion; but the commitment of individual teaching staff varies. The school had attached importance to helping every staff member embrace the idea of inclusive education. For instance, every new staff member is required to attend an introductory talk about the concept of access and support. The teachers were also informed of the various types of students they were likely to encounter, with additional details on the computer register. Some basic advice was also available on how to differentiate curriculum and teaching, and how to utilise EAs in class. This had created an inclusive culture in the school, and had raised teachers awareness.

Wenxiao, 2017

A. Task:

1. open-ended tasks, the type of task that could elicit creative thinking and deep learning, were received differently by the students.

2.

Assessment:

1. The finding that self-assessment was the most effective is rather unsurprising because self-assessment is an integral part in SRL. Although they did not conduct self-assessment in its full, that is, they were not involved in setting assessment goals or criteria, the practice afforded them opportunities to use and hone their metacognitive skills. On the other hand, self-assessment gives students a sense of control and autonomy, which may explain why the students self-efficacy and intrinsic motivation were boosted as a result of self-assessment.

2. Peer-assessment: peer-assessment familiarized students with assessment criteria so that it encouraged self-reflection, critical thinking, and deep learning (Mulder, Baik, Naylor, & Pearce, 2014).

3. When students could choose the assessment task type and difficulty level, and could work in their own time, they used more situational interest enhancement strategies to maintain a level of intrinsic motivation.

	Used (1) shorter assignments and (2) different expectations as the main strategies for adapting their instruction to students with SEN especially students with intellectual disabilities. These two strategies were the easiest way to muddle through their work and resulted from an indifference to the academic outcomes of students with SEN in LRC classrooms.
	(3) Hands-on methods were often applied to allow students with SEN to understand the teaching content through direct interaction with teaching materials or actual operation.
Li & Li, 2020	(4) Visual support, such as enlarged font, was also frequently used. Unlike some other categories of students with SEN, students with visual disabilities have typical cognitive functioning and the same oral communication skills as their peers. Thus, from the perspective of the teachers, teaching accommodations for them were relatively uncomplicated, and these teachers were more willing to help students with visual disabilities.
	(5) To accommodate students with intellectual disabilities, some teachers also applied thematic teaching methods, such as using thematic stories in teaching vocabulary, to enable them to understand the content through contextual interaction.
Zhang, 2021	(6) Group instruction and peer tutoring were the two common forms of instruction in LRC classrooms. Both forms allowed students with SEN to be mentored by other students and to participate in the interactive learning process. Some teachers set up interest groups and assigned students with SEN to different groups, for example, placing students with visual disabilities into music groups and students with hearing disabilities into math or art groups. These instructional forms provided an opportunity for students with SEN to participate in extracurricular activities. Chinese teachers suggested that highly able readers needed teachers special attention, individualised instructions and advanced reading materials, more independent, open-ended and challenging learning opportunities. Open-ended instruction is defined as instruction with unlimited learning goals, questions, strategies and final production.
	Chinese teachers also thought that highly able readers would be disengaged or even be considered as students with bad learning behaviours if they were left alone or needed to learn standardised literacy content in the regular class.
Dulfer, 2019	A. Curriculum: 1. Some teachers used learning goals as a way of problematising the curriculum. During lesson observations researchers identified whether teachers delivered content or problematised it. Problematising content referred to how teachers enabled students critical engagement with the lesson content. 2.One way of ensuring that students were critically engaged in the content was to ensure that the students in the classroom could access and investigate their content independently and thus take control of their own learning. Additionally, there were times when explicitly linking assessments, skills and content enhanced this student agency. In one class students were working on Internal Assessments [IAs] and a presentation in pairs, addressing an aspect of study on immunology and disease. For their IAs, students could choose to undertake any experiment they could come up with.

They found topics they were interested in exploring, tested out the feasibility of their experiments, and changed direction as they needed to, all with the guidance of the teacher.

3. nother way of differentiating content presentation or access that shows promise is the use of a flipped classroom approach. In the following quote a teacher discusses why he has opted to change the way he delivers content. It is important to note that he has not changed the content delivered to students; rather he has changed the way in which he has presented the content in order to enable students to take more control of which content they access and when they access it. This use of technology was a way of allowing students to work at their own pace, with some students watching the material at double speed as they are already familiar with it, and others slowing it down and re-watching to make sure they understand what they are doing. Ensuring that all students have access to the same content has allowed this teacher to differentiate content delivery for students who may otherwise have been ignored, bored or simply out of their depth in his classroom.

B. Teaching:

1. Teachers were using technology solutions such as google docs, kahoot and screencast as a way of providing supports for diverse student needs, but they also differentiated without technology. One teacher had students using individual whiteboards, as they had noted that students were far more likely to attempt a difficult maths question if they could rub out any mistakes as they went along.

2. Feedback was an area that provided some promising examples of how to differentiate in diverse classrooms, with many of the participants in this research giving feedback which scaffolded their students future learning. Teachers responses to the survey indicated that they felt it was important or very important to provide feedback that was formative and student-specific, supporting student reflection. Ninety percent of the participants also indicated that it was important or very important that feedback included student-specific scaffolds to support students to get to the next level.

C. Tasks and Assessment:

One teacher discussed ideas of customising standardised assessments by making sure that individual students were aware of their own strengths and weaknesses.

D. Community:

1. made their classroom environments welcoming and safe by creating respectful relationships with their students, and encouraging students to demonstrate their understanding (or lack of it)

2. Another way of creating a culture of trust was to allow the students agency in the way that they used the space. Teachers spoke about ensuring students can make their own decisions about how they use and interact in their classroom space.

Yuen et al., 2005	A. Grouping: 1. It seems from the data here that teachers do sometimes encourage peer assistance, 2. Using peer assistance --- this type is indeed a powerful teaching strategy, and teachers are wise to develop this student-to-student support network within every class. Asking classmates to help the student with schoolwork and homework (10 times) 3. Pair the student with one who is higher achieving, helpful and well-behaved (6 times) B: Tasks: 1. sometimes allow students with SpLD more time to complete their work, 2. Explain (pre-teach) homework assignments clearly to increase success rate (1 time) 3. Encourage student to stay at school to complete homework (1 time) C: Curriculum: 1. sometimes give them extra assistance during the lesson. 2. Be prepared to set aside time to listen to and talk with the student; rapport (5 times) 3. Talk privately with student s classmates to help them understand the problem (4 times) D: Community: 1. To a small extent they also try to enlist the cooperation of parents 2. Communicate more frequently with parents to show interest and co-operation E. Assessment: 1. Teach student to break tasks down into manageable steps; short-term goals (2 times) 2. Use reward system to reinforce effort and accomplishments (1 time)
Tam, 2009	A. Tasks: 1. students with learning problems can experience school success if only teachers are willing and able to change their instructional practices by designing more individual-focused tasks. A. Community: 1. there was positive correlation between PLC engagement and DI practice. the greater teachers engagement in PLCs, the more DI practice teachers have. This represents that teachers had higher levels of PLC engagement while they put DI into practice more frequently. B. Assessment:
Wan, 2020	I use pre-assessment data to differentiate learning experiences regarding ability level, interests, and learning style C. Task: 1. I use tiered assignments/tasks 2. I provide students with choice about content, process, and/or product (Pt2Q9) 3. I use different assessment forms to meet the differences between my students (Pt2Q4) D. Curriculum: 1. "I match the learning content to the students interests."

Ding et al., 2006	A. Community: 1. most Chinese parents are invited to participate in teacher-parent conferences on a semester basis. 2. communication and interaction between parents and teachers may help teachers and parents to work together to modify instruction or educational expectations to fit each child s need. Parents should gain access to teachers extended support for their children s education and to gain access to knowing more about their children s occupational development. 3. Teachers to gain assistance from parents. B: Teaching 1. Teachers to gain more independence of modifying the instruction to meet specific individuals needs. 2. Teachers to gain the access to assistance from teacher associates or assistants.
Deng & Pei, 2009	(1) Whole-class teaching plus individual tutoring after class or school: meeting individual needs in a collective atmosphere. The lead teacher arranges the tutoring schedule for the student, and students with SEN can catch up with the contents taught in class that they may have not understood; thus, their individual learning needs can be met. (2) Differentiated teaching: responding to difference under a tracking system. Assessment for students with special educational needs should include areas of ideology and morals, cultural knowledge, special skills related to the child s disability and social adaptability should be flexible and beneficial to students enhancement of self-confidence thus different from that for general students. (3) Peer tutoring: emphasizing mutual help and care." Choosing and arranging qualified normal peers as assistant teachers is an efficient solution for students with SEN under the current situation where one teacher has to teach a large student population in one classroom; non-disabled students can develop a sense of mutual help and care and reinforce the knowledge that they have learnt in class through tutoring students with SEN. The use of group learning and peer tutoring successfully reduces teachers working load.

Liu et al., 2020	A. Grouping: 1. In terms of facilitating partnerships between schools and families, classroom teachers usually needed to conduct home visits and hold after-school meetings to maintain face-to-face communications with parents, as well as make phone calls and use social media networks (e.g. WeChat messaging) for instant communication needs. The frequency of such communications tended to decline upon students becoming better adapted to school life. When communicating about students learning needs, the majority of the teachers in this study reported that they helped parents develop educational goals to meet their children s DDs, and then trained parents how to help their children. 2. When students with DDs attended a regular class, the classroom teachers would generally arrange a peer tutor for them. The responsibility of the peer tutor was to help students with DDs adapt to school life by providing necessary assistance in homework and in-class activities participation and so on. The vast majority of the participating classroom teachers agreed on the effectiveness of peer-support and emphasized that this method could achieve positive results only when it is properly designed by the teachers. For instance, two of the involved schools in this study had a specifically designed peer-support program for students with DDs that was jointly implemented by the classroom teacher together with the special education teacher. B. Curriculum: 1. the students were required to spend half a day participating in the comprehensive curricula, which were developed by the special education guidance center or resource room teachers and often covered several areas such as academic tutoring, basic learning skill development and alternative courses regarding life skills. 2. Chinese textbook printed in extra-large fonts customized for her by the Shanghai Visual Impairment Centre. 3. Common adaptive teaching strategies applied by the classroom teachers in this study include the limited use of one-on-one teaching and peer-mediated teaching. C. Assessment and task: 1. teachers, had to gradually lower their expectations and set lower educational goals 2. they developed an adaptive evaluation program for students with DDs 3. One other classroom teacher tried to change the exam format for a child with moderate intellectual disability D. Teaching: 1. Common adaptive teaching strategies applied by the classroom teachers in this study include the limited use of one-on-one teaching and peer-mediated teaching.

Fees et al., 2014	A. Grouping: hands-on learning activities that require the active engagement of the child in small groups B: Community: 1. and encouragement of parents to follow-up on activities at home in the evening and weekends as well as accompanying children on field trips into the community to study. 2. dividing rooms into smaller activity areas allowing for creative, independent, and undisturbed self-selected activities. Teachers also arranged rooms to reflect a unique theme of study. 3. Teachers reported that they were careful to place interactive and manipulative items on the walls to stimulate discussion between child and teacher. 4. Teachers expected parents to engage in their child s education and initiate involvement on an individual level (attending to their own child) as well as on a program level (serving on parental committees or planning activities for Children s Day). C: Teaching 1. Teachers also focus on the development of the child s viability or potential in all areas rather than solely on intellectual capacity (i.e., to read, to write, and to calculate) or on a specific skill as was done historically. 2. Classroom experiences develop the child s social competence, including, as one teacher said, health, quality, child s personality development, and socialization such as the ability to love and to tolerate and accept and so on rather than only moral development as traditionally conceived.
Chiu & Lim, 2020	(1) Technology for cultural knowledge (Chinese, English, and the humanities). Content-specific technology, including ebooks, videos, and games, is more effective in preparing students with weaker relevant cultural backgrounds for meaningful classroom discussion (prediscussion activities). Teachers should allow the weaker students to access digital subject content during lessons. For example, offering mobile devices with relevant content to the weaker students in classes. The students should be free to watch or read the content whenever they feel it is needed. (2) Technology for cultural knowledge (Chinese, English, and the humanities). Content-specific technology benefits students with stronger relevant cultural backgrounds during the reflective process (postdiscussion activities). Teachers are recommended to use watching videos and reading digital articles as homework assignments, instead of traditional work completing exercises printed in textbooks or composition. These homework assignments are more likely to provide students greater autonomy and thinking spaces. (3) Technology for cultural knowledge (Chinese, English, and the humanities). Content-neutral technology (such as authoring software, mind maps, and portfolios) can help students with weaker relevant cultural backgrounds to reflect/share/communicate following discussions (postdiscussion activities). Therefore, we recommend teachers to encourage their ethnic minority students to create artifacts with the technology and continue to introduce their own cultures and languages to their classmates to promote cross-cultural and cross-linguistic experiences. (4) Technology for cultural knowledge (Chinese, English, and the humanities). Content-neutral technology effectively activates prior knowledge in students with stronger relevant cultural backgrounds allowing them to use their past experiences prior to discussions (prediscussion activities). Teachers are encouraged to ask students with stronger relevant cultural backgrounds to prepare the lessons by creating digital content instead of reading articles and doing exercises. This will help stimulate their higher-order thinking skill creativity. (5) Technology for noncultural domain knowledge (mathematics and science). Our results showed

that the ethnic minority and Chinese students have similar preferences with respect to content-level dependency of technology for pre- and postlesson activities. We suggest that teachers should use (a) content-specific technology to consolidate their knowledge before discussions and (b) content-neutral technology such as reflective tools for learning activities after discussions.

(6) Technology for curriculum design in Hong Kong. In Hong Kong, many teachers and other curriculum designers use level-up assignments to cater to learning diversity in inclusive classrooms. For example, an assignment may be divided into three levels easy (fewer words, more guidelines, and images), medium, and difficult (more words, fewer guidelines, and images). However, teachers rarely use different levels of technology to teach their students. Therefore, we encourage Hong Kong teachers and other curriculum designers to use students learning abilities to determine the content-level dependency of classroom technology. For example, Hong Kong public examinations use a 5-level grading scale (level 1: lower and level 5: higher academic performance); therefore, teachers can create a 5-level content-dependency system for videos (level 1: more content-neutral, less informed and level 5 more content-specific, well-informed) to match the public examination grading levels. In inclusive classrooms, teachers can give students videos on the same level to conduct self-study to maximize their learning.

(7) Aids when using content-neutral technology in Hong Kong. Teachers often set a problem or topic for their students when using content-neutral technology. We suggest that appropriate aids or hints should be given to students with less relevant prior knowledge to avoid meaningless discussions. For example, prior to a classroom discussion on how the Bank of China Building reflects Chinese culture, students should be provided with aids including videos about Chinese architecture or blogs about the history of the Bank of China. The students can watch or read the information when they feel they have nothing to contribute to the discussion. We also recommend that the aids should include different content levels and should be labelled accordingly. The labels will assist the students to choose the content they need.

(8) Semi-open content of content-specific technology in Hong Kong. The content-specific technologies that Hong Kong teachers often use in classrooms are descriptive and tell the whole story from beginning to end and from questions to their answers. In other words, the content includes all the facts the students need for the exercises or activities and is presented in linear form. We suggest that teachers make the content semi-open by presenting some, but not all, of it to the stronger students in nonlinear form. For example, teachers can give students mathematics tasks that leave out certain variables/parameters, instead of providing comprehensive tasks (i.e., tasks that include all the variables/parameters); and then the students can manipulate a dynamic diagram in Geo-Gebra (an interactive geometry, algebra, statistics, and calculus application) to complete the tasks by contributing the missing variables/parameters.

Grant et al., 2013	A. Task: tiered questioning and homework B: Curriculum: 1. teachers stressed more that they developed and tested hypotheses about student learning difficulties, and they anticipated students misconceptions while planning. 2. Team planning was another important subtheme that emerged in the findings regarding China teachers. 3. The lectures were mixed with questioning, students responding, and scaffolding. C: Assessment: These teachers used questions and student responses to elicit and interpret students ideas and to understand what students found confusing or difficult. They promptly provided alternative explanations, models, and procedures to represent core concepts.
Pui, 2017	A. Community: 1. Information technology (IT) has proved to be a very powerful tool for students to share ideas and learn from others both from teachers and peers. Working in an IT environment could support those students learning environment. B: Grouping: 1. group discussion/individual tasks 2. Miss Cali used Google Drive as an effective platform to create openings for her students to learn from each other. C: Teaching up: 1.The learning strategies of using mind maps and working on the environment on Google Drive are also applied in students Chinese lessons.These learning opportunities and similar learning environments provided the secure framework for the students to develop fluency and familiarity with their newly acquired skills. 2.Students are taught by the teachers from the start of the course, gaining a basic knowledge of the subject by a direct teacher-led format. After that, in the same lesson, on the same topic, they have the prospect of developing their individual strengths or improving upon their weaknesses for instance, Ben might be assigned to another position in a group task in the Liberal Studies class. This is a good example of how differentiated lesson planning can respond to students group and individual needs. In addition, during the discussion, students could be assigned a different role. This learning environment can target each student s individual characteristics in terms of their level of learning, strengths and weaknesses, then appoint each student to a different role as part of a task. D. Assessment: 1. the students can benefit from face-to-face evaluation because students can understand teachers ideas clearly, and they can ask questions immediately if they feel confused. Teachers also claim that a positive explanation and appreciation can comfort students, helping them to accept their weaknesses and motivating them to improve. For example, written encouragement on students homework and test papers has this effect.

Wang et al., 2020	Squirrel AI Learning is one of the first Chinese developers to introduce an adaptive learning system in its online education platform. Unlike traditional Chinese teacher-centered instruction, the Squirrel AI Learning online system provides student-centered, personalized, interactive and data-analytics-driven instruction to enrich students learning experiences. Squirrel AI Learning s product design is grounded in many of the same principles that inform excellent instructor-to-student instruction. These include: (1) Formative assessments to determine the student s ability level, (2) Problems targeted to the student s ability level, (3) Instant, intelligent feedback including elaborated explanations, and (4) Supports (e.g. tutorials) differentiated by ability level. Adaptive systems effectively accommodate individual students levels of knowledge and learning needs in ways that even highly skilled teachers in classroom settings do not. Learning gains did not differ based on students prior knowledge, gender, age, or parental education, suggesting that Squirrel AI Learning adapts to students needs to promote similar learning gains for all students. Adaptive learning systems have the capacity to mimic a one-on-one tutoring experience, a design feature that likely played a role in the results. In both studies, students who used Squirrel AI Learning independently outperformed those taught by expert teachers.
Wan, 2017	Learning gains did not differ based on students prior knowledge, gender, age, or parental education, suggesting that Squirrel AI Learning adapts to students needs to promote similar learning gains for all students. A. Assessment: 1. 'Use both formative/ summative evaluation (M = 4.70, SD = .94) B. Task: 1. Provide opportunities for students work to be based upon the solving of real and relevant problems (M = 4.59, SD = .83), 2. Vary task by learner profile (M = 4.58, SD = .76) 3. Plan activities that necessitates that students do something with their knowledge (M = 4.57, SD = .80) 4. Use support mechanisms (M = 4.48, SD = .92) respectively. 5. Differ student assignments and culminating project based on individual or group readiness, learning needs, and interest (M = 4.28, SD = .94), 6. Allow for a wide range of product alternatives (M = 4.14, SD = 1.00). C. Curriculum: 1. Necessitate that students apply key understandings and skills of the subject to their own interest areas (M = 4.45, SD = .83) 2. (9) cognitive-processing instruction (10) tiered tasksheets (11) questioning.

Difficulty and Challenges Data

Study ID	Challenges encountered

It was apparent that oral presentation by teacher remained the predominant method used in 11 out of 12 lessons observed. Oral presentations tended not to be adapted at all to individual differences among students; and this passive transmissionist communication style was difficult for students with SEN. These students normally need to be much more actively involved in the learning process. In most cases, oral presentation was supplemented by some form of classroom activity, including drawing, practical tasks, discussion, or project learning. But only in a few classes were activities differentiated according to ability of the students, or any use made of ability grouping. Overall, very little effective differentiation in teaching was observed. For example, in an English reading class all students were required to answer the same set of questions.

Education assistants and mainstream teachers considered that sometimes there is lack of mutual communication. Education assistants pointed out that some teachers did not feel completely comfortable working with them. They suggested that guidance was required for mainstream teachers in utilising and relating better to education assistants.

A main obstacle seemed to be that mainstream teachers had difficulty finding mutually convenient times to discuss lessons in advance with EAs, and that EAs considered that some mainstream teachers were not really prepared to do so. Since the training for EAs do not include lesson planning, the idea of co-planning lessons may better be replaced simply by discussion between teachers and EAs before lesson. EAs should be able to access to the lesson plans before class for better understanding of the content and expectation of each lesson.

Chan & Yuen, 2015

Resource constraints had also limited the effectiveness of EAs in this school. Four full-time EAs and four part-time EAs worked exclusively to provide in-class support for 28 students with special support needs. This ratio of staff to students, while sounding generous, actually means that not all LSC students can have support from an EA for every lesson. This lack of support at times created a problem in continuity, some students finding they were unable to cope. In addition, part-time EAs were usually not present for the full curriculum, and therefore had to spend extra time familiarizing themselves with missed lesson content.

A teacher expressed her difficulties as lack of time for such necessities as differentiating activities and resources.

Lack of commitment was perhaps related to lack of skills needed to carry out efficient differentiation of teaching methods. Classroom observations, and the student shadowing exercise, suggested that teachers practical knowledge for differentiation was generally insufficient. Some teachers remarked that they found it difficult to adapt their teaching styles to address the different needs of students. This suggests that there is room for improvement in the preparation of mainstream teachers so that they possess the necessary practical skills to facilitate inclusion in their subject areas.

1. Teacher feedback did not motivate students. This had to do with the content of the feedback. As the teachers usually provided informational (v.s. motivational) feedback, this type of feedback did not motivate the students (Vollmeyer & Rheinberg, 2005)

2. The reason why in this research peer-assessment was not helpful but had negative consequences was that the students were not involved in genuine peer-assessment. What is worse, limited by their abilities, student assessors are not trusted as the teacher assessors are, giving rise to worries about

Wenxiao, 2017

	subjectivity, unfairness, and inaccuracy (Liu & Carless, 2006). 3. Since the gaokao exerts heavy hands in students learning motivation, the influence of CA environment is negligible. The gaokao is but one of the many hurdles on the lifelong learning journey. Put this way, CA carries even higher stakes than the gaokao. This indicates the need for a mindshift.
Li & Li, 2020	A. the implementation of LRC was hindered by challenges such as: 1. rural teachers were actually practicing differentiation to some extent given their lack of training and resources to provide further support to the students. All participants discussed their lack of knowledge and skills related to special education and systematic support for LRC classrooms. 2. there were fewer types of personnel supporting LRC classrooms in rural areas. It was difficult to obtain appropriate individualised education services in the LRC classroom because of the scarce special education services in rural schools. None of the participants had a special education background or any related in-service training, and there was no available assistance from special education resource teachers. These factors substantially impeded the improvement of teaching quality in LRC classrooms. Further, the paperwork required by special education ordinances such as IEPs was absent, and the teaching time for and management of students with SEN were far from sufficient. Schools did not provide sufficient -professional, financial, or material support. 3. Besides, the salary of general education teachers in LRC classrooms only increased slightly, while they needed to undertake extra work to teach students with SEN. A considerable number of teachers proposed that because of their heavy work-load, they often did not have enough time to consider students with SEN. They were often stressed by the academic performance of students without SEN, which was closely related to their income. Some participants believed the main reason for the lack of school support was that the academic performance of students with SEN in LRC classrooms was excluded from the overall performance of the class. That is, the ranking of the class would not be affected by the students with SEN. This was a compromise that the government imposed to boost the enrolment of students with SEN in schools. If the academic performance of students with SEN in the LRC classroom was included, more schools would reject them. 4. in the rural areas, there were many other disadvantaged children in the LRC classrooms in addition to the students with SEN. Rural general education teachers were too busy to give attention to every student in the class. B. Community: 1. Parents: a. Parents of students without SEN were worried that students with SEN would impede the teaching progress and learning atmosphere in the LRC class because of their stereotypes of students with SEN. In their eyes, students with SEN were associated with low intelligence, challenging behaviours, and disrupted classroom instruction. b. some rural parents of students with SEN refused to admit or mention that their children had SEN, because of the strong stigma attached to disability c. Additionally, most students with SEN in rural LRC classrooms were left-behind children who lived with other relatives, seriously impeding mutual communication between the home and school. Most participants mentioned that the parents of students with SEN in rural areas were not much concerned about students academic outcomes but were just satisfied by the inclusive placement because it provided students with a place to stay. 2. Urban-rural dual system has greatly influenced inclusive education in China and partly resulted in rural-urban disparities

	C. Assessment: 1. the lack of educational assessment for students with SEN is an important reason for the failure to account for their individual needs. 1. This Chinese literacy teacher felt that he could not plan to appropriately instruct his highly able students due to a lack of professional knowledge for gifted education. If professional training regarding gifted education could be provided for teachers in China, the learning experience of highly able children might be improved.
Zhang, 2021	2. Chinese teachers also thought that highly able readers would be disengaged or even be considered as students with bad learning behaviours if they were left alone or needed to learn standardised literacy content in the regular class. 3. Chinese teachers held a relatively negative attitude to their teaching of highly able readers and there was a lack of confidence in terms of the role of school education in developing highly able readers. 4. The core reason perceived by Chinese teachers was that in their education system it was impossible for teachers to plan differentiated contents and reading activities specifically for highly able readers due to insufficient time and energy in large-class teaching. Standardised teaching was preferred in their highly centralised education system and the aim of primary education was perceived to provide basic and general knowledge rather than more in-depth and enriched knowledge to satisfy a small group of children. 5. The ability gap between highly able poor children and rich children would be widened if different after-school learning opportunities are provided by their families (Gromada et al., 2021).
Dulfer, 2019	A.Curriculum: 1. Teachers involved in this study indicated that the content demands of many of the IBDP subjects are very heavy. This impacted on the amount of time available to them to teach specific areas of the content, and on the way in which students could explore the content. There was a sense of pressure which teachers attributed to a range of factors including content-heavy curriculum frameworks and the nature of a high-stakes curriculum. Additionally, some participants felt pressured by their school environments and reputations to ensure that the students achieved high grades. This meant ensuring that all the content was covered, sometimes at the cost of the pedagogical innovation and student agency. 2. This content-filled curriculum impacts on the way in which students can explore new knowledge. B. Teaching: 1. teachers were also concerned that it could lead some students into the path of learned helplessness 2. the teachers remained the locus of control . This led to teachers maintaining a strong framing where students tend to lack choice and in some cases agency. C. Assessment and Task: 1. Because of these high-stakes assessments and the curriculum content demands, many of the teachers felt a lack of control regarding product choice. D. Community 1. Teachers were constantly on the move from classroom to classroom and therefore never set up one space or environment as a supportive space. This was seen by staff as an issue as it denies students being able to take ownership of a room." Observational data suggests that where teachers were always teaching in the same classroom there was a much stronger tendency for the environment to be structured with supports. In one classroom where the teacher always taught in the same space, the display boards were filled with command terms, student work, writing tips and other learning prompts. In this instance the environment was used to help provide differentiated instruction.

	2. Both the teachers and the schools in which they work are not taking full advantage of physical elements of the environment that could support student learning. For example, teachers tended not to move the furniture to support the learning needs of the students. Additionally, the rooms in which classes were working often had empty display boards. These display boards could have been used to support the needs of different students (language charts, command terms, IB-specific terms, examples of assessments, for instance), but they were not.
Yuen et al., 2005	1. Teachers in this study very rarely apply strategies of this type, presumably because of the additional effort required in planning and implementation, and perhaps due to a need to follow a prescribed syllabus and work toward examinations.
Tam, 2009	1. teachers teach an average of 30 35 periods per week, so their schedules are hectic. 2. schools are event oriented, school affairs are usually stressful, and there are tight control mechanisms set up to minimize uncertainties, which gives little freedom to teachers to decide what they want and how they do their work. 3. primary and secondary teachers prefer to work in isolation, and their work tends to be repetitive in nature, lacking access to new ideas. 4. most of the teachers are unfamiliar with the reform agenda due to lack of knowledge or understanding of them 5. As regards to the constraints experienced by teachers when they try to adopt new modes of instructional practices, teachers report a high level of learning problems (mean = 2.4032, SD = 0.5611) and behavioral problems (mean = 2.4189, SD = 0.5473) in the classrooms. 6. classroom and institutional constraints are likely to prevent instructional practices being conducted smoothly, thus making sustainability of these practices more difficult. 7. organizational constraints are seen as one of the major factors that obstruct teachers when adopting new modes of instructional practice in the classroom, and this factor has the largest negative impact on sustainability. 8. problems in learning and disruptive behaviors are seen as classroom constraints that hinder the adoption of whole class instructional practices, but facilitate the adoption of individual-focused instructional practices. 9. secondary schools in Hong Kong have an average class size of 40, so they tend to focus their teaching at the level of students with average learning aptitudes and tend to neglect students with learning difficulties. 10. furthermore, findings in the present project suggest that even when these teachers are willing to adopt the new instructional modes, the whole class teaching approaches will continue to marginalize those students with weaker learning aptitudes.
Wan, 2020	1. Data-driven curriculum decision making is still disconnected from actual practice when it comes to addressing the needs of students. 2. Teachers were oriented toward student learning, but they less likely experienced shared and supportive leadership. 3. The low PLC engagement group had less professional training in catering for learner diversity

Ding et al., 2006	A. We hypothesized that Chinese parents had limited exposure to and understanding of individualized instruction utilized in developed countries, even though they had a positive attitude towards it. B. 21% of the teachers believed that it was challenging to implement individualized instruction in China. C. About three-fifth (61%) of the teachers agreed that the discrepancy between students placed them at a very challenging position guarantee an appropriate education for each student. D. Three-fifth of the teachers reported the need to gain the access to assistance from teacher associates or assistants. In addition, half of the teachers reported the desire to gain assistance from parents. In-service training or workshops will be an important addition for Chinese special education teachers to improve their professional expertise. E. About half (44%) of the teachers reported the need to voice their opinions and suggestion about instruction and school reform. F. In addition, approximately half of the teachers believed that a comprehensive evaluation system is warranted for implementing individualized instruction. G. Chinese parents with children who have disabilities have limited communication and interaction with each other. H. Most of the special education teachers realized the limitations in the current curriculum, instruction techniques, and supporting services. I. In other words, the curriculum and its delivery are mandated by outside personnel and very limited adjustment/modification is allowed. J. At least 41% of the special education teachers have concerns about their pay and workload, since their salary is usually lower than the average salary for regular education teachers (Ashman, 1995). K. approximately 30% of them believed that teachers were overwhelmed by their current work
Deng & Pei, 2009	A. Community: Equal access to education and social life for individuals with SEN still represents a radical challenge to the long-held social and educational perspectives in Chinese society. B. Teaching up: i. The lack of teaching training is often identified by teachers as one of the significant barriers to inclusion (Scott et al. 1998). ii. Teachers do not have adequate time for tutoring. C. Resource: Little support and few resources are available in general classrooms for both teachers and students with SEN in China (Deng and Poon-McBrayer 2004). D. Assessment: Academic achievements are overemphasized since they are the only standard used to assess students performance and schools effectiveness under the current competitive education system. Appraisal of teachers work is also totally dependent on students scores in various exams. E. Grouping: it is not uncommon that tutoring became an extra burden for students without disabilities, and their parents often worried that their children s achievement would be lagging behind by spending time on tutoring students with disabilities. Also, students with disabilities found difficulties in making friends with their peers, and felt lonely in mainstream classes although isolation was deliberately avoided by teachers.

Liu et al., 2020	1. The intensified workload and complexity of the tasks involved cause classroom teachers to dread the implementation of academic support. Classroom teachers had to act alone to figure out the specific curriculum design and take charge of academic tutoring. Most classroom teachers reported that they could only give one-on-one teaching to students with DDs after school when they were available. Yet their availability to do one-on-one teaching was often scarce and limited. 2. When academic support was mentioned, the classroom teachers all expressed feelings of low self-efficacy about their teaching practices. This gave rise to their negative perception of dealing with students needs and difficulties. The low self-efficacy of these teachers regarding provision of academic support appeared to result from a variety of factors such as lack of curriculum standards, teaching materials, and adaptive performance evaluation systems for students with DDs, as well as lack of inservice training for teachers in using effective methods to teach students with DDs. All the teachers expressed their desire for the school district offices in charge of special education services to provide classroom teachers with appropriate curriculum standards, teaching materials, and adaptive evaluation systems to better meet the educational needs of students with DDs. The lack of clear curriculum standards for students with DDs was the primary challenge facing classroom teachers when they set up educational objectives. The lack of appropriate teaching materials made the classroom teachers feel that teaching students with DDs was like making bricks without straw. 3. The lack of an adaptive learning performance assessment meant that the classroom teachers did not really have corresponding benchmarks to refer to when providing academic support. Certain classroom teachers provide limited or no support to these students academic development, as their students with DDs have not been included in the school s evaluation system. The students with DDs in several districts were not included in the school s evaluation system despite being placed in regular classrooms. Instead, their progress was assessed by the resource teachers or special education teachers alone, on the basis of students IEP goals. In terms of academic achievement evaluation, the majority of classroom teachers stated that the same tests were given to students with and without DDs. Despite the fact that students with DDs faced many difficulties in answering the questions in the exams, most of the schools do not know how to provide (appropriate) evaluation programs for them owing to limited expertise among the faculty. 4. limited teaching time and the lack of expertise and teaching skills to handle students with DDs. 5. serious problems that require immediate solutions including lack of course standards, teaching materials, and corresponding student evaluation systems. 6. the majority of the teachers expressed several concerns regarding the training. However, the qualification and certification process of the training does not seem to be attractive to teachers, and the school does not reduce the daily workload for support teachers participation in such training. 7. expressed a strong demand for administrative support from the school and professional support from corresponding experts. 8. Chinese teachers feel powerless and inefficacious in facing the numerous challenges in their everyday practice 9. teachers had to gradually lower their expectations and set lower educational goals, where they face a more difficult level of academic learning. 10. Students had to use the curriculum identical to the general curriculum for students without DDs at the same grade level and all the courses were taught in regular classrooms without special accommodation. Owing to the lack of resource classrooms and special education professionals in these school districts, the students did not have access to have an adaptive curriculum that is able to meet their DDs. In-class teaching content is mainly about knowledge and skills developed for typical and average students to

	master. The educational needs of students with DDs were rarely met. 10. grouping: The major sources of stress lie in the emotional and behavioral problems of the students with DDs and opposition from the parents of typically developing peers. 11. A large increase in the amount of paperwork for the teachers, following the acceptance of students with DDs in their class, had caused difficulties for the classroom teachers. When faced with a heavy workload, the classroom teachers expressed their urgent needs for having (i) administrative support from the school leaders, (ii) professional support from special education teachers, and (iii) parental involvement of students with DDs. (i) Although the teachers invested a great deal of energy and extra time in dealing with students with DDs in their classrooms, they were not given sufficient financial compensation. (ii) The classroom teachers expressed their desire to get different types of professional support from special education teachers. This support included: providing individualized education to students with DDs, establishing a special education consultation platform, and having an expert working alongside the classroom teacher in the regular classroom. (iii) Many parents of children with DDs, upon facing the fear of rejection by the school and teachers, often chose not to disclose publicly their children s problems. Moreover, as teachers lack sufficient understanding of the problems of students with DDs, particularly those with autism, the students were not provided with appropriate education to meet their DDs, leading to parental distrust toward the school and classroom teacher. In addition, the teachers mentioned that a small number of parents took a laissez-faire attitude toward the education of their children, making classroom teachers efforts appear to be in vain. One teacher stated, She (the mother of a child with DD) has two children, and she tends to put all energy in the education of the typically developing child; this is also a problem (FG1C03). As a result, the classroom teachers were faced with the problem of poor communication with some parents while trying to provide academic support to the students with DDs.
Fees et al., 2014	Teachers identified four challenges to meeting individual needs in the kindergarten: (1) limited resources (particularly between urban and rural programs), (2) high child-to-teacher ratio (two teachers and a nanny in a class of 30 or more children), (3) an exam-oriented educational system that requires mastery performance in subject matter, and (4) diversity in child rearing practices between families and between families and the teachers expectations for behavior.
Chiu & Lim, 2020	N/A
Grant et al., 2013	China teachers found it more challenging to differentiate their teaching due to large class size, pressure from an examination-driven education system, limited instructional time, and high density of curriculum content in China educational system.The observation data further supported this finding by indicating their instruction primarily involved whole-group instruction.
Pui, 2017	1. The teachers also acknowledged that students with learning difficulties need more time to master their newly-acquired knowledge or skills. 2. with the limitations in terms of lack of resources, teachers professional training, etc; balancing students individual and group needs is always a complex challenge for teachers, especially in a special educational context.

Wang et al., 2020	1. While education equity in China has improved significantly, it is still below the international average 2. Adaptive learning may help to address the drawbacks of large Chinese class sizes. However, research shows that the reduction in class size alone is insufficient to promote learning gains. Teachers intention to use student-centred approach is demotivated by the current contextual factors such as class size and teacher professional development. Teachers expressed that student-led activities were hardly used in daily teaching due to big number of students in a class. Teachers expressed that they did not feel comfortable about the use of student-centred approaches to help students learn as its effectiveness is not easily measured and may take more time in its preparation. Meanwhile, teachers realised that SEN students had behavioural problems and this would affect their teaching.
Wan, 2017	Time. Interview data showed that teachers insufficient time is mainly due to heavy workload such as fully-packed teaching schedule and administrative work. Teachers were concerned about the availability of time for material preparation, understanding of students needs and collaborating with other teachers. Lack of professional development. Lack of understanding teaching strategies is one of the obstacles faced by teachers in doing DI. Survey data found that few teachers felt they were not well-equipped with knowledge and skills in doing DI. Interview data also indicated teachers awareness about professional development in differentiation as teachers did not receive pre-service teacher training about DI and found it hard to effectively use DI for maintaining students motivation and making learning progress.