

Differentiated Instruction From 2016 To 2021 : A Systematic Literature Review

Xu LiYu and Lee Keok Cheong

Abstract – As the students in mainstream classrooms become more diverse in many countries around the world, traditional teaching “One size fits all” ignores the individual needs and characteristics of students. New teaching methodologies and practices arise, such as differentiated instruction. Differentiated instruction that meets students diverse and various needs of learning has become a focus in the current worldwide educational reform. This literature review analyzes the research regarding differentiated instruction in China and foreign countries. The systematic literature searched from the electronic databases CNKI in China from 2016 to 2021. The search term was “differentiated instruction”. 304 English journals and 739 Chinese journals were retrieved. The analysis reveals three themes: the connotation of differentiated instruction, the history of its development, and the practice of differentiated instruction. The focus is on summarizing the classic models of differentiated instruction research in various countries as well as the challenges faced. Findings show that because of linguistic and cultural differences, Chinese and foreign scholars have different views of differentiation and differentiated instruction. There is a need for a clearer definition of differentiated instruction. In the practice, the famous and classic model of differentiated instruction is pointed out by Tomlinson, and most of the researches are not out of this model. Now, differentiated instruction also face challenges such as teachers think it is hard to organize and do not willing to use differentiated instruction. Some researches use new education technology to solve these problems and make differentiated instruction fit for current education tendencies.

Keywords – Differentiated Instruction, Review, Differentiation, Model, Challenges

I. INTRODUCTION

The traditional teaching model “One size fits all” in mainstream classroom has become more and more difficult to adapt to meet the requirements of talent training in the new times (Yao, Wu, & Li, 2018). The rapid development of information technology in the 21st century and the deep integration of technology and various fields have forced changes in the field of education. Education policies in various countries have been introduced to provide guidance

Xu LiYu, Jiaying University, China & City University, Malaysia (Email address: 2918580980@qq.com).

Lee Keok Cheong, City University, Malaysia (Email address: lee.cheong@city.edu.my).

and policy support for education reform (Zhao, & Zhu, 2019). The differentiated instruction is the way for teachers to appropriately address students’ various learning needs (Marcela, Verena & et al, 2019). It is generally agreed that it paid attention to differences of students in education instruction. And in traditional education, students’ individual characteristics,

such as the difference in learning style, thinking and development, are ignored (Gibbs, & McKay, 2021). Differentiated instruction is consequently seen as an innovative teaching strategy which attempts to break away from the rigidity of traditional class instruction, also has been recognized as a promising approach (Tomlinson et al., 2003; Merawi, 2018). It is very close to the concept of “teaching students according to their aptitude” advocated by the Chinese educator Confucius (Hua, 2019), so it has also attracted attention in the Chinese education circle and incorporated it into the concept of China’s teaching reform.

Differentiated Instruction researches are based on the theoretical basis of constructionist represented by Piaget (1969), the theory of multiple intelligence by Gardner (1999), and students’ zones of proximal development (Vygotsky, 1976). It was first proposed by Ward (1961) as a systematic theory designed to address the needs of special or gifted students, but later evolved to respect the differences of learners and address the diverse needs of individual learners (Tomlinson & Allan, 2000; Tomlinson et al., 2003). In order to know more about the research situation, development and challenge of differentiated instruction, this literature review analyzes the research regarding differentiated instruction in China and foreign countries.

II. METHOD

The systematic literature searched from the electronic databases CNKI with complete resource types and comprehensive content in China. Differentiated Instruction can also be expressed as “Differentiate teaching”,

“Differentiating Instruction” and “Differentiation of Instruction”, usually referred to simply as DI. Therefore, Search term was identified as “differentiated instruction”. Sample search: (Item%=xls('differentiated instruction') or Title%=xls('differentiated instruction')) AND (published time Between('2016-01-01','2021-12-31')); Search scope: Journals. Finally, 304 English journals and 739 Chinese journals were retrieved.

III. FINDINGS AND DISCUSSION

The different definition of differentiated instruction between China and foreign countries

Chinese and foreign scholars have different understanding about the definition of differentiated instruction. Differentiating research expert Tomlinson first in 1995 explained that differentiated instruction for students to obtain information, understand ideas and express their knowledge learned in a variety of choices, that is, a differentiated classroom can provide a variety of teaching content, teaching methods and allow a variety of teaching results. In her book “How to Differentiated Instruction in Multi Capability Classroom” (2003, 3-10), she started from studying what differentiated instruction is not, and summarizes the core concept of differentiated instruction. In her opinion, differentiated instruction is not an individualized teaching, not an out-of-control classroom teaching, not a fixed homogeneous group teaching, not a simple adjustment of single-dimensional classroom teaching. Differentiated instruction is the instruction that teachers actively pay attention to students’ differences, is the teaching that focuses on quality than quantity, based on evaluation, provides diversified teaching content, processes and results, student-centered, is the combination of the whole class, group and individual teaching, and is the combination of teaching and learning. On this basis, she believed that in different teaching classes, teachers will take the initiative to design and implement various forms of teaching content, teaching process and teaching results according to the students’ preparation level, learning interest and learning needs. American educator Heacox (2004) holds a similar view that differentiated instruction is required to change the speed, level, or type of teaching to meet the learning needs, learning style, or learning interests of different learners.

Canadian scholar Roy, & et al. (2017) argued that differentiated instruction is a systematic program utilizing academic progress monitoring and data decision-making to change the way of instruction to fit students’ abilities. Under this definition, differentiated instruction includes two important links: Instructional Adaptations and Academic Progress Monitoring. This definition makes differentiated instruction more specific, focusing on the scientific and reasonable evaluation of students’ differences as an important basis for differentiated instruction, pays attention to interdisciplinary teaching and integrates differentiated instruction into information technology.

In China, the famous educator Confucius mentioned in the Analects that “teaching students according to their aptitude” and “teaching without discrimination”, which coincides with the western differentiated instruction, and is also the core of the definition of differentiated instruction. The earliest differentiated instruction Chinese researcher is Hua Guodong (2019) showed the definition of differentiated instruction. Differentiated instruction referred to the class collective teaching based on the differences of students’ personality, meets the needs of students individual learning, in order to make each student fully develop on the original basis. The definition emphasizes the unity of commonness and personality. Zeng Jiyun (2007) mentioned that differentiated instruction refers to the differential teaching activities starting from respecting students’ individual differences in classroom teaching activities, so as to promote the personalized development of each student's subjectivity. In general, Chinese scholars’ understanding of differentiated instruction follows the educational thought of Confucius (Hua, 2019) and is also based on the research of Western scholars. It is defined from the basis of students’ differences, the implementation of differentiated instruction process and the realization of differentiated development.

From their definition of differentiated instruction, it can be seen that the main core of differentiated instruction. First, differentiated instruction is student-centered. Second, differentiated instruction is based on respect and reasonably evaluating student differences. Third, differentiated instruction does not conflict between the individual development goals and the national standardized evaluation. Differentiated instruction is recommending a curriculum content based on the same standards but fit best for different

learners (He, 2018). The third point is the most important core which can distinguish differentiated instruction from hierarchical teaching and personalized teaching.

Domestic and foreign scholars' definitions of differentiated instruction emphasize that teacher's activities of teaching base on the individual characteristics of students, and they recognize that the environment of differentiated instruction is classroom teaching system. However, from the Western and Chinese definitions of differentiated instruction, differentiated instruction in foreign countries focuses on students' differences and individuality to stimulate their diverse potential through differentiated instruction. Chinese scholars, on the other hand, are more likely to use differentiated instruction as a strategy for teaching improvement, with the aim of maximizing the full potential of students at their current level of knowledge.

Historical Development of Differentiated Instruction

Differentiated instruction began abroad in response to the neglect of students' subjectivity in traditional education, the shortcomings of the classroom system and the need to cultivate talents in the changing times, and sprouted out of a reflection on traditional education (Yang, & Yuan, 2021). With the development of globalization, exchanges between countries in the field of education have become more frequent and there is a trend towards the convergence of educational concepts (Tang, & Song, 2020). After the emergence of differentiated instruction in the United States, it was followed by corresponding research in developed Western countries such as the United Kingdom, Italy and Australia, and gradually in Asian countries such as South Korea, Singapore, China and even African countries such as the Congo and the United Arab Emirates (Tang, & Lynn, 2020), and even countries such as the United Kingdom, Switzerland, Austria and Australia have introduced differentiated teaching standards to promote teachers' implementation of differentiated teaching methods (Muhamad, Martin, & Raymond, 2017).

Development of Differentiated Instruction around the world

Promoted by the industrial revolution in the 18th and 19th centuries, the class-teaching system became popular in

the second half of the 19th century. The class-teaching system was designed to train in bulk the talents needed for industrial production and to cope with the rapid development of the industrial revolution (Zhang, & Cai, 2021). The "one-size-fits-all" approach to teaching and learning in the classroom, which was adopted in the pursuit of efficiency, has gradually become more and more problematic (Lu, 2020). Especially, the differences in students' understanding of the content of the teacher's lectures and the pace at which they progress are different. The teacher will pay more attention to students in the middle of the academic ability and understanding range (Bondie, Dahnke, & Zusho, 2019).

At the end of the 19th and beginning of the 20th centuries, the shortcomings of traditional education were no longer well adapted to the productive needs of society in Western countries (Jiang, 2019). Scholars began to criticize traditional education, and the idea of differentiated instruction began to emerge. The most famous of these was the idea of "starting from the child's nature", proposed by the famous American philosopher and educationalist Dewey, who stressed the importance of respecting and developing the child's nature while also emphasizing the differences that existed between children, a truly scientific pedagogy cannot be established as long as children are treated in a uniform way (Liang, 2018). Each child has a strong personality. Only if the teacher knows each pupil can she hope to understand the child, and only if she understands the child can she hope to develop any educational program that will either meet scientific or artistic standards (Dewey, 1994).

Dewey's ideas on education had a huge impact on the development of societies in Western countries, prompting scholars in all subject areas to focus on the development of the educated and the fact that differences existed. And at this time, with the gradual spread of compulsory education in all countries, large numbers of students began to receive schooling, and as the number of students increased the classroom system of student diversity was challenged (Liang, 2018). During this period, American scholars began practicing how to teach for student differences, with Burke and his students beginning to experiment with individualized teaching, which attracted the attention of the educational community. However, individualized instruction is the equivalent of "one pupil, one program",

with too much emphasis on refinement, resulting in a large amount of human and material resources being spent. However, the introduction and practice of individualized instruction has provided the theoretical and practical basis for the emergence of differentiated instruction. Meanwhile, in the 1950s, “education for the gifted” became prevalent in Western countries (He, 2018). It was a way of teaching children with different IQs in a different way, following on from individualized teaching, and was a step towards differentiated instruction. In his study of gifted education, American scholar Virgil S. Ward first coined the term “differentiated education”. Differentiated instruction officially began its journey in the field of pedagogy. However, it is worth noting, that Ward’s “differentiated instruction” was designed to accommodate gifted education, for students with very high levels of achievement, not for all students, and to focus only on students’ IQ (Liang, 2018).

Howard Gardner, a professor of psychology at Harvard University in the USA, proposed the theory of multiple intelligence in 1983, arguing against limiting students’ intelligence to IQ (Ma, & Yu, 2017). At this point, the concept of differentiated instruction is basically complete. Based on it, the concept of differentiated instruction took formal shape in Tomlinson’s book, *Differentiating Instruction for Advanced Learners in the Mixed-Ability Middle School Classroom* (1995), she explained the meaning, characteristics and operational recommendations of differentiated instruction. Her research on differentiated instruction is based on differentiated instruction for all students in a classroom system.

In the nearly thirty years since 1995, foreign research on differentiated instruction has shifted the object of research on differentiated instruction from gifted children to all children in the classroom, from focusing on single-item differences in ability to differences in multiple intelligence (Jiang, 2019) and from basic education to higher education, and from theoretical research to practical research (Liang, 2018). It can be said that research about differentiated education abroad has accumulated a wealth of theoretical and practical results, and has provided many experiences for China to draw on in developing differentiated instruction.

The Development of Differentiated Instruction in China

From a global perspective, the current new round of scientific and technological revolution and industrial

revolution is breeding rise, major scientific and technological innovation is leading new changes in social production, the Internet, artificial intelligence and other new technology development is constantly reshaping the form of education, the way to acquire knowledge and the way to impart, teaching and learning relationship is undergoing profound changes (Lu, 2021). China has put forward the strategy of developing the country through science and education and the strategy of strengthening the country through talents, to the strategy of giving priority to education in response to the wave of globalization and the industrial revolution, insisting on giving priority to education, vigorously promoting comprehensive reform in the field of education, and supporting the modernization of the country through education modernization. And it has successively issued the China Education Modernization 2035 and the Implementation Plan for Accelerating the Modernization of Education (2018-2022). In the China Education Modernization 2035, it emphasizes on tailoring education to the needs of learners and meeting their needs for personalized and diversified learning and development (Ministry of Education of the People’s Republic of China, 2019). In the 21st century, China has placed emphasis on educational innovation, focusing on the curriculum and the classroom, improving the way teachers teach and academics learn through the development of innovative curricula and the provision of effective teaching resources, in order to enhance the quality of teaching and promote student learning, with the aim of changing the past situation where teachers dominated large classes and students’ individuality, interests and strengths were not valued in the teaching and learning process (Yang, 2020). The teaching method of “teaching to the individual” proposed by the famous Chinese educator Confucius more than 2,000 years ago is still widely recognized in the Chinese education sector, and this has laid the ideological and methodological foundations for the acceptance of differentiated teaching and learning in China’s domestic education reform (Yan, & Hua, 2020).

The implementation of differentiated instruction

As mentioned above, some researchers put forward differentiated instruction theories. Most of researches were used these theories to guide the implementation of differentiated instruction. In the practical researches, the

effectiveness and the challenge of differentiated instruction are the focus.

The typical Model of Differentiated Instruction

Pozas and Schneider (2019) proposed and summarized three typical models of DI known in the literature and practice: Tomlinson, Hall, and Lawrence-Brown. Tomlinson’s model (see Figure.1) is a classic model, of which the elements include content, processes, product, and student readiness, interest, and learning profiles (Tomlinson, 2017). The content is input, that is, what the student has learned. Process is how students understand ideas and information. The product is output, how students present what they have learned and use their new knowledge. According to the readiness, interest and learning profile of students, teachers flexibly modify content, process, and product. Many subsequent research about on differentiated instruction theoretical models are not out of Tomlinson’s differentiated instruction model and are adjusted and optimized on this foundation. Compared with Tomlinson’s model, Hall’s DI model added student assessment before starting a unit (Coubergs et al., 2017). Lawrence-Brown’s model focus on the goal of giving more support for struggling students and helping them achieve grade-level or minimum standards (Pozas, & Schneider, 2019). The research of Bondie and Dahnke (2019) reveals that 64% studies used Tomlinson’s framework to guide their definition and implementation of differentiated instruction in the classroom.

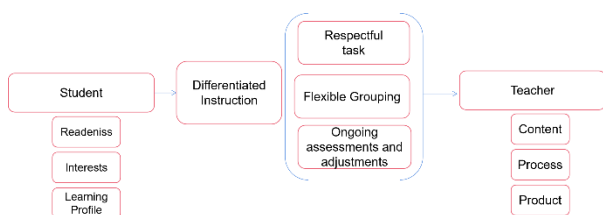


Figure 1. Model of Differentiated Instruction (Adapted from Tomlinson, 2017)

In China, Chinese scholars also put forward different differentiated instruction models. Yan, XueMing and Hua Guo Dong (2020) construct differentiated instruction model. Its special point lies in that on the basis of paying attention to the differences of students, it not only makes clear how students learn, but also makes clear how teachers teach (see Figure 2). Another model is summarized by a primary school which is called Yang Zhou Yu Cai School (Li, 2021). This

school has been committed to the research and practice of differentiated teaching strategies and models, and is one of the initiators of the National Alliance of Experimental Schools for Differentiated Instruction, which has developed a mature model of differentiated instruction in practice: “Pre-learning Differences - Appropriate Differences in Initial Learning - Research and Guided Differences - Expanding and Spreading Differences in Learning” (Jia, & Yang, 2016). In a word, in China, the model constructed by researchers is still a reform based on Tomlinson’s classical model, although it has been improved according to the actual teaching situation in China.

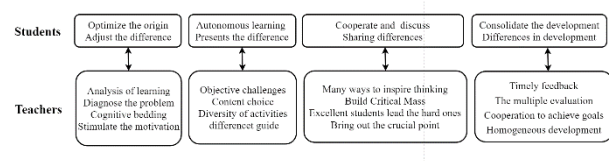


Figure 2. Differentiated Instruction Model (Adapted from Yan, X.M. & Hua, G.D., 2020)

Effectiveness of the implementation of differentiated instruction

The researches of differentiated instruction practices have been conducted in many disciplines and different perspective. Boelens et al. (2018) explored instructors’ strategies for and beliefs about differentiated instruction in blended learning, together with how the differences between instructors can be explained. Prast et al. (2018) examined the effects of a teacher professional development (PD) programme about differentiated instruction on students’ mathematics achievement. Studies on child and instruction interactions showed that learning growth depends on the fit of instruction to students’ abilities (Förster, & et. al., 2018). Purpose The Contribution of Goddard et al. (2018) was to examine connections between teachers’ perceptions of their collaboration, their reported use of differentiated instruction (a particular instructional practice), and teacher efficacy in high-poverty rural schools in a Midwestern state. Geel et. al. (2018) question whether these instruments truly capture the complexity of differentiation.

Smale-Jacobse et. al. (2019) set out to provide an overview of the theoretical conceptualizations of differentiated instruction as well as prior findings on its effectiveness. Differentiated instruction applies an

approach both to teaching and learning that offers the students a variety of choices to gain information and better understand the newly acquainted knowledge (Antonios, & et. al., 2021). Most researches reveal that differentiated instruction has a potential positive impact on students' academic performance, with a small to medium effect (Smale-Jacobse, Meijer, Helms-Lorenz, & Maulana, 2019). It better helps to increase learners' awareness of their own learning potential (Karimi & Nazari, 2021), and students are more intrinsically motivated and more invested in their learning, more willing to be prepared to achieve goals, to perform tasks that match their abilities and to develop their self-competence (Guay, Roy, & Valois, P., 2017).

In China, the implementation of Differentiated teaching research involves two aspects: subject or professional development and curriculum reform, aim to promote quality education and achieve talent development goals in China (Li, Nie, & Zhang, 2020. Wang Yan et al. (2017) argue that using differentiated instruction gives all people the opportunity to experience success. Han XiaoFan et al. (2018) implemented the differentiated instruction in the course "Fundamentals of Mechanical Design". Teachers used diversified learning choices to adjust students' learning differences and effectively mobilized students' learning enthusiasm. Chen YanHua et al. (2019) prove that this teaching mode is effective in improving computer application ability and cultivating computational thinking. Lin YuZhu et al. (2019) carried out a one-year educational experiment, and the research results showed that differentiated instruction can significantly improve students' Chinese academic performance; The more abstract the Chinese teaching content, the more significant the impact of flexible grouping on students' corresponding cognitive ability; With the change of cognitive dimension from low to high, the training effect of homogeneous grouping was gradually weakened, while the training effect of heterogeneous grouping was gradually enhanced. Above all, in these empirical researches, the findings about effectiveness of differentiated instruction are consistent with those of western countries.

The challenges of differentiated instruction in practice

Although differentiated instruction is prominent in the field of education, it can bring many positive results to teaching and learning (Deunk, 2018), but incorporating differentiated instruction into the classroom remains a

potential challenge for teachers (Van Casteren, 2017; Yang, & Yuan, 2021). Lavania and Nor (2020) analyzed the literature about the challenges of differentiated instruction, summarized 10 kinds challenges that teachers faced and divided these into two types: the challenges range from external factors such as support from school management till internal factors such as self-efficacy. Concluded the literature that mention the challenges of differentiated instruction around the world include China, reveals that the challenges come from teachers and students.

For challenges from students' side, Aldossari (2018) stated that students were not very clearly know about the significance and importance of differentiated instruction. They are used to using traditional teaching methods in the classroom, on the one hand they are not ready for differentiated instruction (Wan, 2017), on the other hand do not know how to adapt to the new methods (Lavania, & Nor, 2020).

For challenges from teachers' side, one of the challenges of differentiated instruction mentioned in the existing research is that teachers have low organizational capacity (Jager, 2016; Lunsford 2017). Teachers, lack of necessary knowledge, or lack of rich teaching experience lead to lose control of the course process or classroom management (Lavania, & Nor, 2020); curriculum; class size (Aldossari, 2018; Shareefa, & et al, 2019); school management and necessary support from the school, such as training and school facilities (Jager, 2017; Aldossari, 2018), above factors influence the organization of differential teaching. At the same time, teachers' beliefs about differentiated instruction are not strong (Liu, G., 2017). In the opinion of teachers, differentiated instruction requires too much time and effort and there is a tension between differentiation, efficiency and equity (Jager, 2017; Shareefa, & et al, 2019; Godor, 2021). Meanwhile, the diversity of learners makes it difficult for teachers to identify and dynamically assess their diversity (Bondie, Dahnke, & Zusho, 2019; Lu, 2021).

Face to these challenges, in order to make differentiated instruction fit for current education tendencies and more feasible, scholars began to pay attention to how to solve these problems. Some researches use new education technology to solve these problems. Al-Rsa'I, & Shugairat, (2019) put forward that modern technology has a wide range of applications in education, using it in differentiated instruction to identify students'

level of interest and readiness, as well as to develop appropriate learning patterns for each of them. Huo YuJia (2019) analyzed research experience in using intelligent tools in English classroom teaching, providing reference for teachers to use intelligent tools to assist English differentiated instruction. He Bin (2018) combined smart education with differentiated instruction mode and put forward a framework model for designing differentiated instruction mode from the perspective of smart education.

IV. CONCLUSION

Differentiated instruction is an innovative instruction approach that meets students diverse and various needs of learning, increase the development of students' performance and academic success, and has become a focus in the current worldwide educational reform. This literature review analyzes the research regarding differentiated instruction in China and foreign countries. Researches of differentiated instruction around the world has yielded many results, laying the foundation for theoretical researches and practical researches to guide differentiated instruction. Findings show that because of linguistic and cultural differences, Chinese and foreign scholars have different views of differentiation and differentiated instruction. There is a need for a clearer definition of differentiated instruction. In the practice, the famous and classic model of differentiated instruction is pointed out by Tomlinson, and most of the researches are not out of this model. Now, differentiated instruction also face challenges.

There are need for further research. Such as Tomlinson (2003) mentioned, "What we do know is that current classrooms are more academically diverse than ever and that most of those classrooms are ill-equipped to deal with the range of needs". So, it is a gap to be researched whether differentiated instruction can be practiced in a well-equipped environment, or in a new non-traditional classroom setting will be better than in current classroom environment.

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