

Teacher 4.0: Its Role in Differentiated Instruction

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Abstract

Implementing smart technologies in teaching in line with the aspirations of Education 4.0 is extremely important. An emerging global issue is how to ensure 4.0 technology-assisted teaching methods produce differentiated instruction or personalised learning adapted to different types of student backgrounds, including student profiles and demographics, learning performance level, socio-economic status, attitudes, and interests. Teacher 4.0 is a concept adapted for future teachers with the ability to handle new technology and implement it efficiently in their classes. The role and ability of Teacher 4.0 in integrating smart technologies into teaching can no longer be denied but the extent to which such teachers are skilled in producing effective differentiated instruction to meet the various requirements of students remains questionable. A systematic review of Teacher 4.0 in differentiated instruction will help overcome this problem. Therefore, this study proposes a comprehensive process to collect and extract literature to address this research gap and analyse the most significant studies on Teacher 4.0 in differentiated instruction. Research papers from Scopus, Web of Science, and Google Scholars databases were retrieved and 18 articles were finalised for inclusion in the study. The results indicated that the predefined requirement criteria for Teacher 4.0 in differentiated instruction were not always satisfied, with few studies reporting on the issues. Thus, a conceptual research framework measuring the effect of Teacher 4.0 in differentiated instruction should be developed. This could provide evidence to determine the effectiveness of Teacher 4.0 roles in catering for the disparate range of student capabilities.

Keywords: Teacher 4.0, Differentiated Instruction, Differentiated Learning, Personalized Learning, Technology-Assisted Teaching

Introduction

The use of technology in the process of teaching preparation and delivery of instruction is increasingly becoming essential. Since the introduction of 21st century learning, the development of technology in education has grown rapidly. Teachers are given training and guidance in various skills to ensure they are proficient in adapting various technologies into their teaching strategies. Furthermore, the advent of the Industrial Revolution 4.0 has had an immense impact on the education system as a whole and resulted in Education 4.0. The

combination of various technologies can systematically help teachers with various aspects of teaching according to the suitability of the environment and the level of student learning. Various virtual technologies in communication networks, interactions, data storage, and resource references have elevated existing teaching methods to a greater level. Such virtual technology is also aligned with smart technologies such as virtual reality, augmented reality, robotics, and 3D printings (Ginja & Chen, 2020). The implementation of 4.0 technology-assisted teaching and learning has become a priority in the education sector. It not only helps educators to enhance their teaching, but also improves the creativity of teachers while motivating students to be more focused on the learning process. Each student has a different level of learning, thus conventional teaching methods have made it difficult for knowledge to be conveyed perfectly. Presenting knowledge by generalising the method to all students will cause imbalances and lead to difficulties for students in understanding the content taught.

Differentiated instruction (DI) has helped educators to identify the diversity of student learning levels and deliver teaching more effectively. This approach is also known as personalised learning. The use of technology has considerably helped facilitate the process of delivering instruction and can help educators to be creative in providing appropriate teaching methods for students. Each individual student has a different level of diversity. Furthermore, the integration of 4.0 technology into the teaching process will help produce more creative and innovative teaching strategies. The main factors that teachers need to consider before preparing lesson plans are demographic aspects, environment, time, attitudes, and level of learning, including students' socio-psychological environment (Aljaser, 2019). Socio-psychological elements that have been measured include students' verbal expressions, a feeling of intimacy in the classroom, acceptance of the class, positive interactions, understanding the system, rules and behaviour, and availability of enjoyable learning. By applying 4.0 technology-assisted teaching strategies, teaching methods can be personalised according to the level of each student. This allows information and knowledge to be generated and communicated more effectively.

The skills and knowledge required to integrate 4.0 technologies into teaching strategies is one of the elements in Teacher 4.0. The skills typically required are to be competent, ready for challenges, a problem solver, and being innovative (Abdelrazeq et al., 2016). However, the concept of Teacher 4.0 in education system is still new. Thus, a teacher's level of mastery in producing a truly effective method using integrated 4.0 technologies remains unclear. Time constraints in identifying the problem of student diversity, a long preparation process, data misuse, and technical problems are the main reasons why teachers are still unprepared to respond and orient completely towards the use of 4.0 technology. Numerous studies have been conducted to assess the effectiveness of technology in assisting teaching (Ishak et al., 2021; Fesharaki & Fetanat, 2020; Kapi et al., 2017; Fahimirad 2018) and DI (Alsalhi et al., 2021; Palieraki & Koutrouba, 2021; Suson et al., 2020; Synekop, 2020; Kopeyev et al., 2020; Karatza, 2019), but the extent to which studies focus on Teacher 4.0 in DI remains unclear. Therefore, this paper will explain the findings of relevant literature focusing on the role of Teacher 4.0 in differentiated instructions.

a. Teacher 4.0

The concept of Teacher 4.0 is connected with Education 4.0 which stems from a gradual evolution of educational technologies (Peredrienko et al., 2020). Teacher 4.0 is to be adapted for future teachers who are able to handle new technology and implement it efficiently in their classes (Abdelrazeq, 2016). Teacher 4.0 should create conditions for the development

of creative thinking and action and for the transformation of this creative action into a real result in the context of the digitalisation of education (Smolyaninova & Bezyzvestnykh, 2019). A competent Teacher 4.0 should systematically implement professional activities in a digital society, integrating their knowledge and interdisciplinary skills (Smolyaninova & Bezyzvestnykh, 2019).

Figure 1 listed the challenges and requirements of Teacher 4.0 which are divided into (i) human-based and didactical challenges, (ii) organisational challenges, and (iii) technological challenges (Abdelrazeq, 2016). Three teaching scenarios have been derived to manage the current technological revolution in the context of Teacher 4.0. Direct students' response refers to students' focus and attention in large classrooms. This has been a long-term challenge in academic teaching. Smart technological devices are believed to capture movements and detect a student's physiological status. The results are then sent to the teacher's notification device. Automated feedback will improve communications and students' attention levels. Teachers' self-feedback refers to a system offering feedback regarding teachers' performance in the classroom and how to improve it. For example, the use of wireless earphones and other notification devices such as augmented reality glasses will help teachers to correct mistakes, increase attention, or ensure proper understanding at exactly the right time. Multilingual communication focuses on facilitating the teaching of multilingual students in the same classroom. Using smart devices will enable students to work under the same conditions for successful e-learning.

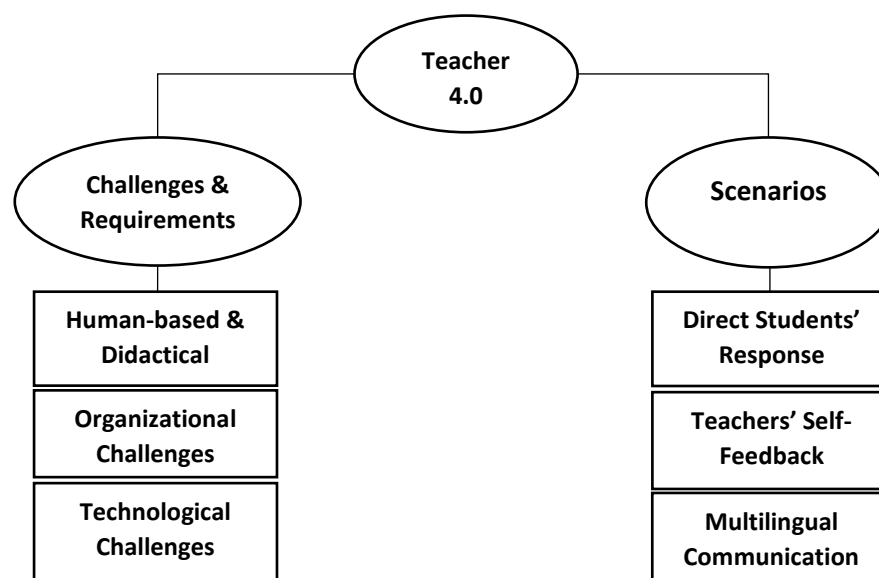


Figure 1. Teacher 4.0 elements by Abdelrazeq et al (2016)

b. Technology Assisted Teaching and Learning

The Industrial Revolution 4.0 that has impacted education systems around the world requires teaching and learning to be undertaken in a variety of methods either through physical meetings or virtual classrooms. Furthermore, 4.0 technology-assisted teaching is a strategy that can help make the current learning process easier and allow knowledge to be conveyed in various ways. Horizon Report (2018) listed the five most critical technologies involving smart tools that have had a major impact on the education system, as presented in Figure 2.

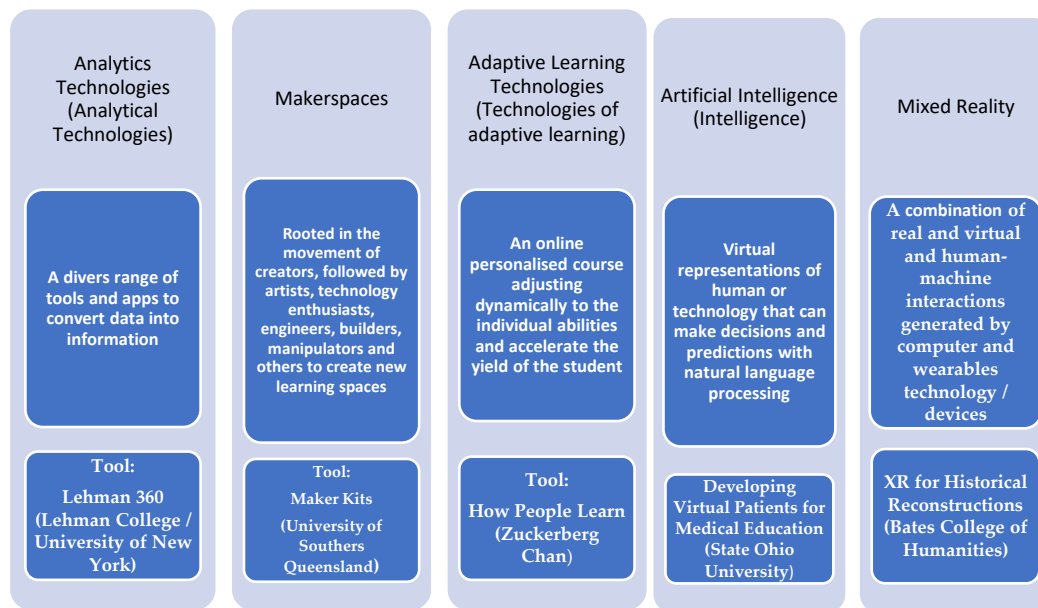


Figure 2. Most critical smart technologies that have impacted Higher Education from 2018 – 2022 (Horizon Report, 2018)

Figure 2 lists five types of smart technology that are expected to help accelerate the education system, especially in higher-learning institutions. Each technology built will create a new perspective and innovative methods aiding the teaching and learning process. Educators will have a variety of technological tools available to assist them in upgrading teaching methodology as the next effective strategy. (1) Analytics technologies is a system and technique that is widely used, mostly in commercial industries, to enable organisations to make business decisions. Scientists and researchers also use analytics tools to verify or disprove scientific models, theories, and hypotheses. They can be applied in the education system to collect information and analyse data about learners, thus providing a one-stop data pool. (2) Makerspace is a place in which people with shared interests, especially in computing and technology, can gather to work on sharing projects, ideas, equipment, and knowledge. (3) Adaptive learning technologies is a technology-based or online educational system which provides real-time learning, assessment of performance, and modification of different teaching methodologies to suit individual needs. (4) Artificial intelligence (AI) is a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. In education, AI is used for marketing, recruitment, admissions, determining financial aid, answering common questions from students, and analysing data collected in the Learning Management System (LMS) and other academic data repositories to improve advisory services and retention (Pence, 2019). (5) Mixed reality is a blend of physical and digital worlds, unlocking natural and intuitive 3D human, computer, and environmental interactions. This is achieved through the maturation of creative conventions and experimentation with real-world applications. This includes delivering interactive storytelling experiences, collaborative design environments, technology demonstrations, games, and educational or training programmes (Ishak et al., 2021; Hughes et al., 2005).

Teachers must be able to implement 4.0 technologies in designing methods, strategies, and the delivery of knowledge in their teaching. A systematic use of multiple technologies adapted in the teaching process will enable information delivery and knowledge to become easier and

more effective [45, 39]. The method of combining various types of smart technology is what constitutes the true meaning of innovative teaching. Systematic use of multiple technologies will result in more time-saving teaching methods, accelerate communication and immediate feedback, ensure more efficient and secure storage of information and facilitate the construction of creative and interactive lesson plans (Karatza, 2019). The teacher who is well trained will successfully improve their teaching strategies. It is believed that a competent Teacher 4.0 will enable other teachers to adapt innovative teaching methods according to the importance and suitability of each student learning phase.

Figure 3 presents the average use of ICT for teaching in various countries. The report released by the OECD based on its Teaching and Learning International Survey (TALIS) (OECD, 2018) indicates that Mexico and Turkey lead in terms of teachers' readiness to apply ICT and technology in their teaching. A total of 260,000 teachers were involved in this survey which involved 15,000 primary, lower, and upper-secondary schools from 48 countries. The findings reveal considerable progress still needs to be made in order to ensure that teachers are skilled and receive the training they deserve. Less than half felt well prepared when they joined the teaching profession. Readiness and preparation among teachers should be in line with the development of skills and training, as well as adequate technological facilities in the education system.

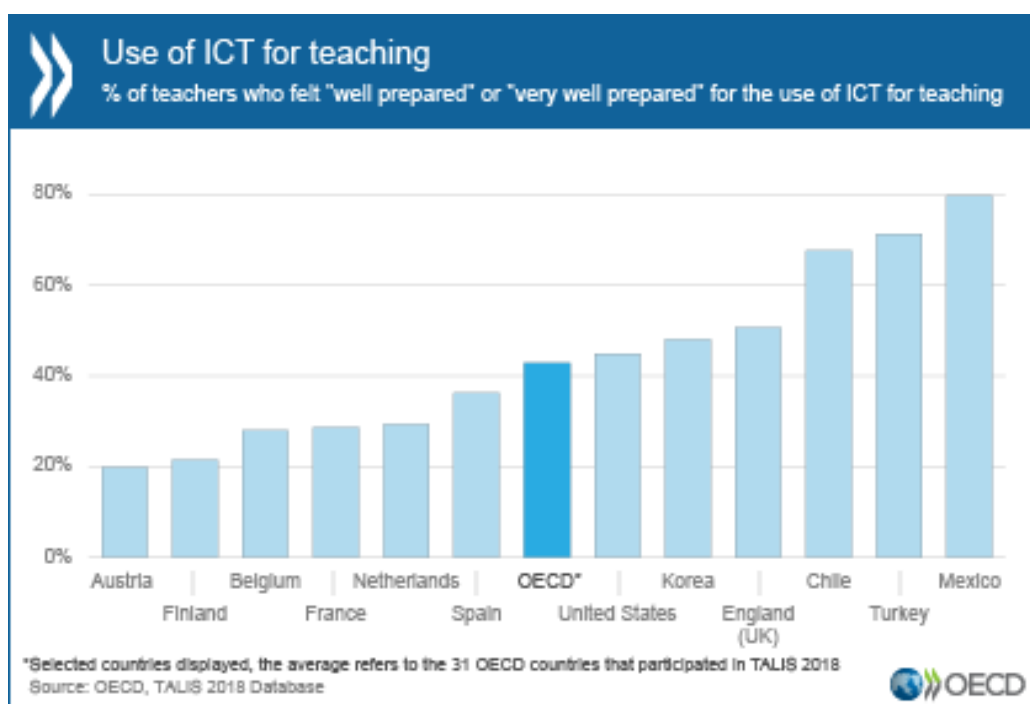


Figure 3. The Use of ICT for Teaching by OECD (2018)

Digital and technological teaching aids have been identified as helping educators develop a variety of teaching methods better and more creatively to produce personalised learning. Studies also indicate that technology particularly facilitates teaching preparation, especially for students with different skills such as those in special education classes (Cheng & Lai, 2020). Owing to physical or mental disabilities, students with these conditions often encounter more difficulties in learning. To address this, researchers have adopted technology-supported tools to enhance the adaptability of such students to the learning environment, improving their levels of academic achievement (Dümenci et al., 2021; Cheng & Lai 2020). Students also tend

to learn using numerous modern applications and various means of technology through pedagogies such as heutagogy (self-determined learning), paralogy (peer-oriented learning), and cybergogy (virtual-based learning) (Shareefa & Moosa, 2020; Tajudin et al., 2021). Teachers' readiness with respect to the Industrial Revolution 4.0 technology (Yaruz, 2020), differentiated learning styles [(Al Mashaghb et al. 2019), and understanding how to personalise their learning (Din, 2015; 2016) according to Bloom's taxonomy (Matore, 2021) using a universal design for learning (Din, 2019; 2020a; 2020b) should be considered. The need to improve their technological skills is extremely important, especially in terms of meeting the needs of industrial revolution citizens (Din, 2019). The concept of being competent in using multiple technologies as part of an innovative teaching strategy can be considered one of the core elements of Teacher 4.0.

c. Differentiated Instruction

DI (or differentiated teaching) is a method that considers the different needs, inclination, and interests of students, along with differences between levels of understanding and their capabilities (Alsalhi et al., 2021; Aldossari, 2018). DI is also a teaching strategy that can meet the various criteria of individual students as opposed to teaching delivered generally to a large group of students (Alsalhi et al., 2021). Teachers can differentiate the learning styles or personalised learning content using a range of tools to create instructions regarding what is to be taught, how the content is to be taught, how learning will be evaluated, and how to differentiate students' level of readiness (Tomlinson & Imbeau, 2010; Yavuz, 2020). DI is a teaching approach which enables educators to prepare a strategic and effective plan to enhance students' learning. It is a teaching and learning theory that employs disparate teaching approaches to the same group of students or in the same classroom. As such, it aims to accommodate the needs, interests, aptitudes, personalities, different abilities, and experiences of the full range of students (Onyishi & Sefotho, 2020; Mulder, 2014; Shareefa & Moosa, 2020).

To differentiate instructions, instructors need to make initial observations and understand each difference and the level of student learning required. Instructors need to provide an array of approaches, learning methods and understand how students will receive the learning information that will be presented. Instructors need to provide DI that includes the following three items: (1) content, (2) teaching process, and (3) assessment (Alsalhi et al., 2021; Onyishi & Sefotho, 2020; Aljaser, 2019). In the process of teaching preparation, educators not only need to emphasise how DI is used to deliver lesson content to students, but also to adapt the learning approach used to the most appropriate pedagogy in compliance with the curriculum (Onyishi & Sefotho, 2020).

d. Model and Framework of Differentiated Instruction

According to Ginja and Chin (2020), Palieraki & Koutrouba (2021), Smets & Struyven (2018), Alsalhi et al. (2021), Onyishi & Sefotho (2020) and Stollman et al. (2021), there are several principles and characteristics of students that will help teachers to organise their teaching preparation. As indicated in Figure 4, there are eight characteristics of students that are critical to observe before teachers plan their teaching strategy, namely (i) interest, (ii) readiness, (iii) thinking skills, (iv) learning profile, (v) learning capabilities, (vi) attitudes, (vii) experience, and (viii) needs (Aljaser, 2019; Al-shaboul et al., 2021). All these characteristics need to be evaluated and considered to determine whether the strategy of DI is appropriate to meet the needs of each individual student. Teachers also need to ensure DI meets the three

teaching criteria, namely suitability with the content, selection of the teaching process, and the outcome product which involves using appropriate assessment methods. By adapting DI in both teacher-student strategies, a more effective and efficient teaching method is produced provided that all criteria are considered and properly met.

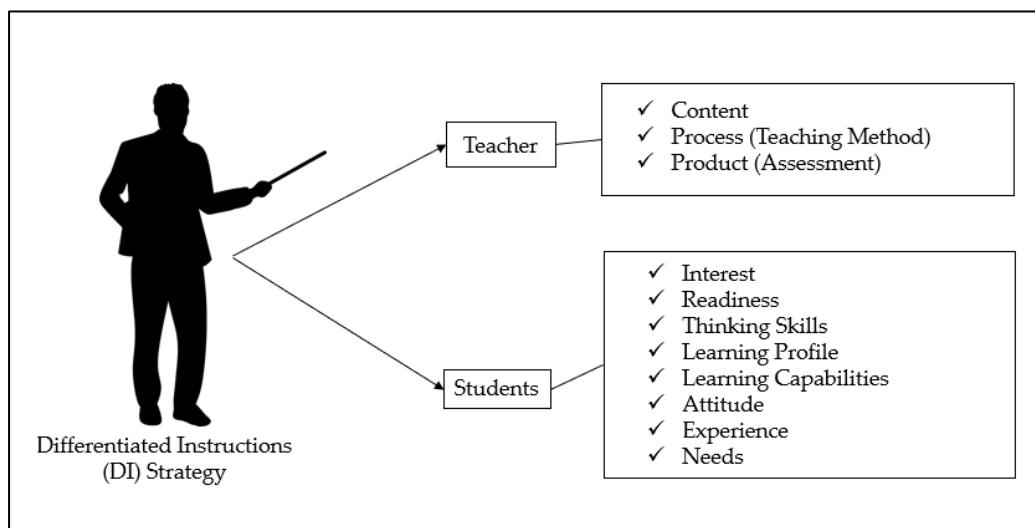


Figure 4. Differentiated Instruction Strategy

e. Problem of Differentiated Instruction

The problems encountered in providing the best methods and strategies for DI are time constraints, complicated preparation, and failure to identify appropriate methods for each student's needs (Aljaser, 2019; Al-Shaboul et al., 2021; Ginja & Chen, 2020). If a class has a large number of students, each of whom has a different level of learning, it is not only difficult for each teacher to provide the best teaching methods, but also preparation and lesson planning will take longer. This can demotivate teachers in delivering their teaching. These problems have had large effects on students such as a loss of focus in learning sessions, lack of interaction between students and teachers, a widening gap between excellent and weak students, students becoming demotivated to learn, and weakening student performance (Aljaser, 2019; Onyishi & Sefotho, 2020).

Method and Review Process

The SMR is a method employed when a focused area of inquiry is at an early stage of development (McDaniel-Peters & Wood, 2017; Masdoki et al., 2021). SMRs are not primarily concerned with assessing the strength of findings, concluding optimum interventions, and classifying papers with sufficient detail to answer the broad research questions (Heeb et al., 2020). An analysis focused on identifying design requirement gaps in the mapping review literature, as measured against the predefined criteria requirements for Teacher 4.0 in DI, is depicted in the process chart in Figure 5.

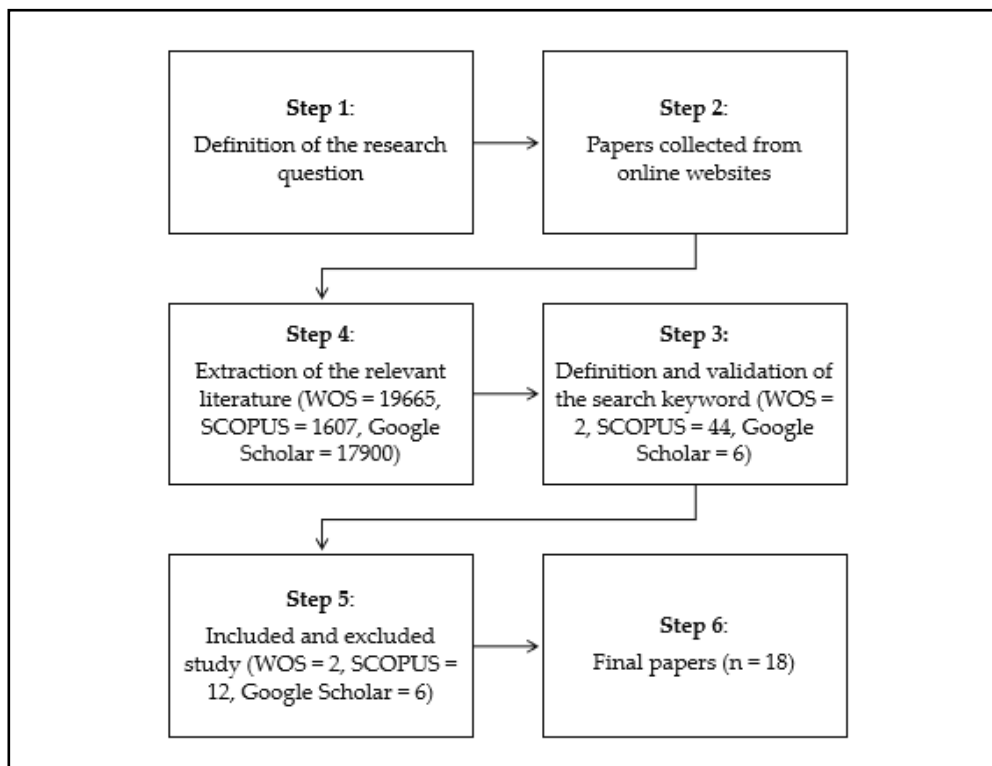


Figure 5. Systematic Mapping Review Process

A search for systematic reviews in several sources such as SCOPUS, Web of Science (WOS), and Google Scholar found no studies conducted specifically both on Teacher 4.0 and the use of 4.0 technology in DI. However, several studies have been conducted from 2015 to 2022 that examine the effectiveness of general technology on DI. A research question was developed which was then categorised as keywords for studies (Gabarre, 2015). Applying filters generated 52 articles. These keywords are digital, technology, Teacher 4.0, differentiated instruction (DI), and personalised learning (PL).

Next, filtration excluded: (1) studies before the year 2015; (2) studies that did not explicitly describe a peer review process; (3) studies unrelated to teaching; (4) studies that only featured DI or personalised learning without investigating the integration of technology; and (5) English language paper (Masdoki et al., 2021) revealed that only 20 papers matched the criteria. Only good quality articles match the title or content consisting of the keywords were chosen to reduce the value of the critical review due to a 'garbage in-garbage out' process (Schleicher, 2018). The final number of papers included in the study after the last filtration was 18. The results of the information search are summarized in Table 1.

Table 1

The Total Articles Classified by the Databases.

| Databases | Keywords | | | | |
|----------------|---------------------------------------|------------------------|-------------|-----------------------------|-----------------------|
| | Implementation of Digital in DI or PL | Technology in DI or PL | Teacher 4.0 | Differentiated Instructions | Personalized Learning |
| Scopus | 1 | 6 | 2 | 3 | 4 |
| WOS | 1 | 1 | 0 | 1 | 1 |
| Google Scholar | 4 | 1 | 1 | 3 | 1 |
| Total | 6 | 8 | 0 | 7 | 6 |

Studies not related to the field of education or teaching and learning were excluded. Studies that did not explicitly describe Teacher 4.0 or differentiated instruction were also eliminated. Only studies featuring the implementation of digital or technology in DI or Teacher 4.0 were selected. Overall, three studies were conducted on Teacher 4.0, two from Scopus and one from Google Scholar. No studies were undertaken on the integration of the Teacher 4.0 concept in DI or personalised learning. Details of the articles are reported in the next section.

Results

The final set of articles was categorised according to the specific domains they manage, the details of which are presented Table 2.

Table 2

Report of the Critical Analysis of Literature

| Authors | Year | Journal | SC | WOS | GS | Dig | T | T4.0 | DI | PL | Country |
|-----------------------|------|---|----|-----|----|-----|---|------|----|----|------------|
| Jakobsen et al. | 2021 | <i>Lecture Notes in Computer Science</i> | | | ✓ | ✓ | | | | ✓ | USA |
| Chua et al. | 2021 | <i>Journal Of Nusantara Studies (Jonus)</i> | | ✓ | | ✓ | | | ✓ | | Malaysia |
| Ismail et al. | 2021 | <i>Journal of Social Sciences & Humanities</i> | | ✓ | | | ✓ | | | ✓ | Malaysia |
| Palieraki & Koutrouba | 2021 | <i>European Journal of Educational Research</i> | ✓ | | | | ✓ | | ✓ | | Greece |
| Synekop | 2020 | <i>Journal of Teaching English for Specific and Academic Purposes</i> | ✓ | | | ✓ | ✓ | | ✓ | | Ukraine |
| Peredrienko et al. | 2020 | <i>International Journal of Instruction</i> | ✓ | | | | ✓ | ✓ | | | Russia |
| Synekop | 2020 | <i>Advanced Education</i> | ✓ | | | | ✓ | | ✓ | | Ukraine |
| Weir | 2020 | <i>ProQuest LLC</i> | | | ✓ | ✓ | | | ✓ | | USA |
| Kopeyev et al. | 2020 | <i>International Journal of</i> | ✓ | | | | ✓ | | | ✓ | Kazakhstan |

| | | <i>Emerging Technologies in Learning</i> | | | | | | |
|------------------------------|------|--|---|---|---|---|---|--------------|
| Smolyaninova & Bezyzvestnykh | 2019 | <i>Journal of Siberian Federal University</i> | ✓ | | ✓ | ✓ | ✓ | Russia |
| Csapó & Molnár | 2019 | <i>Frontiers in Psychology</i> | ✓ | | | ✓ | | Hungary |
| de Jager | 2019 | <i>South African Journal of Education</i> | ✓ | | | ✓ | ✓ | South Africa |
| Karatza | 2019 | <i>International Journal of Information and Education Technology</i> | | ✓ | | ✓ | | Greece |
| Min & Theng | 2018 | <i>Journal of Integrated Design and Process Science</i> | | ✓ | ✓ | | ✓ | Malaysia |
| Montebello et al. | 2018 | <i>Conference: Fourth International Conference on Higher Education</i> | | ✓ | ✓ | | ✓ | USA |
| Tahiri et al. | 2017 | <i>International Journal of Emerging Technologies in Learning</i> | ✓ | | ✓ | | ✓ | Morocco |
| Abdelrazeq et al. | 2016 | <i>Researchgate.net (Conference Paper)</i> | | ✓ | | ✓ | ✓ | Germany |
| Balakrishnan & Lay | 2015 | <i>Telematics and Informatics</i> | ✓ | | | ✓ | ✓ | Malaysia |

*Note: SC=Scopus | WOS=Web of Science | GS=Google Scholar | Dig=Digital | T=Technology | T4.0=Teacher 4.0 | DI=Differentiated Learning | PL=Personalized Learning

As indicated in Table 2, all articles show that the implementation of digital tools and technology enhances the effectiveness of creating DI or personalised learning, as it assists teachers in the teaching process. However, the integration of Teacher 4.0 in producing DI has rarely been addressed, representing a clear gap in the literature. Teaching in this era requires teachers to understand and master the technological skills. They must adapt the new dimensions of teaching and learning in the 4.0 industrialisation transformation era in line with the current global benefits of modernisation. To achieve this, teachers should be aware of the myriad varieties of technology demands exhibited by students. A competent and skilful teacher integrating 4.0 technology-assisted teaching and delivering DI will be able to cater for different learning styles. Thus, it is important to know how far the skills and competencies of Teacher 4.0 assisting disparate student learning capabilities will contribute to an enhanced learning process and better student performance. All 18 articles implemented the digital or technology as a single tool. The technologies most commonly employed are listed in Table 3.

Table 3

Types of technology used in differentiated instruction

| Types of technology | Author |
|--|---|
| Online application software, biometric finger printing, word processor | Csapó, & Molnár (2019); de Jager (2019); Karatza (2019); Montebello et al. (2018); Palieraki & Koutrouba (2021) |
| Online conceptual maps, digital textbooks, e-books, audiobooks, flashcard | Jakobsen et al. (2021); Min & Theng (2018); Synekop (2020) |
| Scientific videos/audios, simulations, visualisations, video files, animations. | Ismail et al. (2021); Min & Theng (2018); Weir (2020) |
| Websites (Google classroom, WebQuest, any interactive websites) | Balakrishnan & Lay (2016); Kopeyev et al. (2020); Synekop (2020) |
| Social media (Telegram, Messenger, WhatsApp, Instagram, Tik Tok, Twitter, YouTube) | Balakrishnan & Lay (2016); Ismail et al. (2021) |
| Virtual classroom, hybrid classroom | Chua et al. (2021); Tahiri et al. (2017) |

The information from Table 3 was analysed to reveal the percentage of each technology used in DI. The results are depicted in the following bar chart.

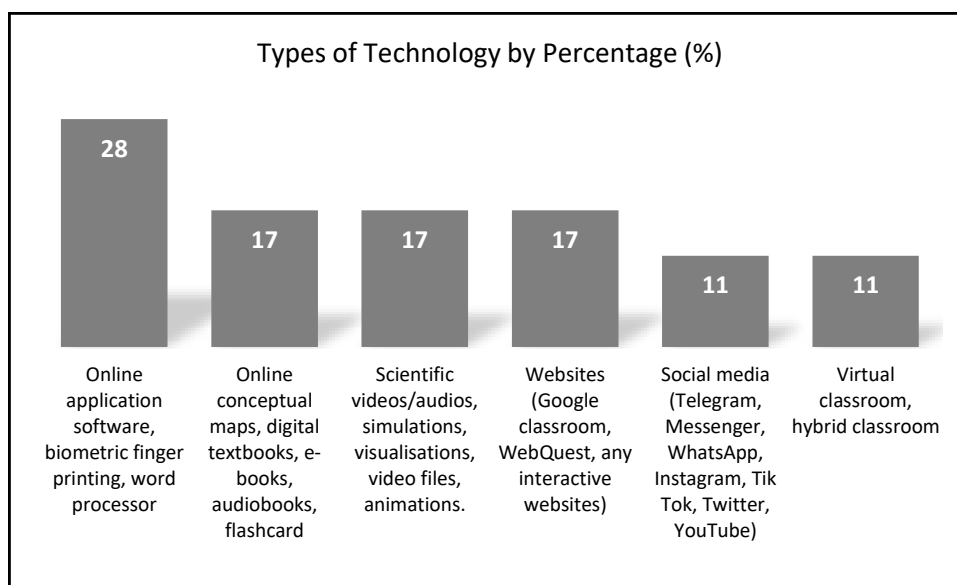


Figure 6. Types of technology used in differentiated instruction

As indicated in Table 3, studies reveal the usage of digital tools or technology employed in DI or personalised learning. This approach is clearly believed to enhance the learning styles of students with different capabilities. As the results in Figure 6 indicate, 28% of papers examined the effectiveness of online application software, biometric finger printing, and word processors in DI; 17% examined the use of online conceptual maps, digital textbooks, e-books, audiobooks, and flashcards in DI; 17% examined the use of scientific videos or audios, simulations, visualisations, videos files, and animations; 17% used interactive websites such as Google classroom; 11% focused on the use of social media in DI,

and the remaining 11% studied the effectiveness of virtual and hybrid classrooms. Overall, the existing technology that is widely used and examined in previous studies is in line with 4.0 technology-assisted teaching. Teachers were found to integrate various type of technologies to deliver instructions and create personalised learning strategies. This reveals that teachers have already implemented the elements of Teacher 4.0 in their teaching and learning process. However, no studies measure the specific role and elements of Teacher 4.0 in DI. This limits the findings and indicates a potentially large research gap.

Discussion

The existence of extremely rapid technological diversity is expected to help the process of planning and preparing lessons to be more effective and efficient. Teachers will have an array of options and alternative technological tools available to deliver DI to their students. This helps not only in saving time, but also in developing more creative and innovative teaching methods. It is believed that the teaching and learning process will be more effective by implementing the elements of Teacher 4.0. With the existence of technologies such as virtual reality (VR), augmented reality (AI), and smart devices, various applications and software will produce outstanding teaching methods that will encourage students to focus in class, improve their skills and expertise using technologies and increase their motivation.

Teaching requires creative and effective skills (Masdoki et al., 2021; Ramli & Nurahimah, 2020). This is to ensure it will benefit students with differentiated learning styles. The adaptation of Teacher 4.0 in differentiated learning is illustrated in Figure 7 below. Teachers play a role in appropriately planning how 4.0 technology can be used to deliver lesson content effectively. Two variables that should be taken into account are i) the role; and ii) requirements and challenges of Teacher 4.0. Teachers need to ensure that the teaching method used can meet the various characteristics of students. However, the extent to which these two variables will influence the method requires further analysis. A future study is recommended to study the effect of the integration of Teacher 4.0 in DI on students' interest, readiness, thinking skills, learning skills, learning capabilities, attitudes, experiences, and needs. Students should be given the option to choose how they will complete their assignments, while teachers should determine the method of assessment employed to monitor the progress and performance of students more efficiently and easily.

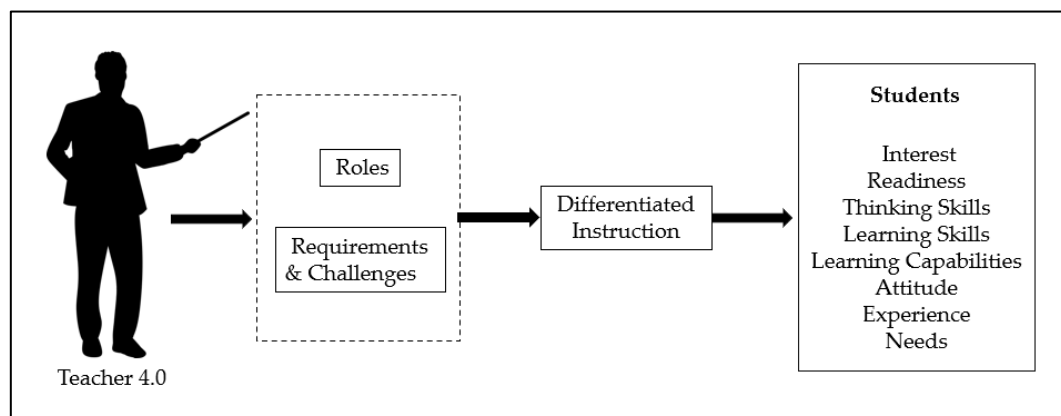


Figure 7. Proposed Conceptual Framework of Teacher 4.0 in Differentiated Instruction

Conclusions

In conclusion, the implementation of Teacher 4.0 in DI is essential, providing huge benefits to teachers and students in the Industrial Revolution 4.0 era. Moreover, 4.0 technologies such as smart tools and devices are no longer considered as teaching aids but as part of the mandatory teaching criteria. The concept of being competent in using multiple 4.0 technologies as part of an innovative teaching strategy can be considered as one of the elements of Teacher 4.0. Integrating Teacher 4.0 elements has the potential to diversify delivery methods more effectively. This may also close the gap between the learning levels of students with various levels of achievement and abilities. It can help increase the interest and motivation of students, and to upgrade the education system to a better level. However, to achieve this goal, the responsible parties and institutions need to provide teachers and students with appropriate facilities. Furthermore, to achieve the requisite objectives, adequate training and skills need to be provided to enable teachers to develop more creative and innovative teaching methods.

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Data Availability Statement

Data sharing is not applicable.

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Conflicts of Interest

The authors declare no conflict of interest.

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