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Individualized Learning with Technology: Meeting the Needs of High School Students

Chris Bernat and Richard Muller (Rowman & Littlefield Education, 2014),219 pages, ISBN 978-1-4758-0587 (Price-Hardback 56.00 $ Paperback 28.00 $ eBook 26.50 $)

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1. Introduction

The book, 'individualized learning with technology: meeting the needs of high school students' was written by Chris Bernat and her father Richard Muller. He was a professor in educational psychology, and he wrote four books and numerous articles which contributed a lot to the field of education. He passed away in 2005. After his death, his daughter, Chris Bernat, added her thoughts on computerized instruction and adult education to finish what her father had already started, and she published the book in 2014. Bernat is a technical writer and instructional designer who has worked for many information technology companies. She has psychology and education (instructional technology) backgrounds. Her area of interest in adult education and instructional technology instigated her to write this book.

The book has 219 pages. It has an introduction and 13chapters. In the introduction, the authors underscore that these days, high schools are not preparing students to be independent learners for the future; instead, in most situations, one-size-fits-all instruction is commonly practiced that disregards the diversified needs of students. As a result, students do not retain much after they leave school. To alleviate this problem, an individualized technology-based instruction is essential to cater for students' different needs and interests. However, computerized or technology-based instruction does not mean replacing the traditional classroom; rather it is meant to complement, to enhance, and to personalize instruction. This is necessary as the world becomes civilized and moves to a more knowledgeable society.

Keywords: /High School Students /Individualized Learning/Technology-based Instruction/

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2. Review of the Book

2.1 Chapter One: Needed: A Revolution in Learning

This chapter states the need for education reform. Technology is widely used throughout the world for various purposes, so there should be an educational reform to inculcate technology-based instruction in the school curriculum. Technology impacts students' learning by promoting their motivation to learn more than the formal education does. It allows for control; that is, students have full control of what to learn, how to learn and soon, which is almost impossible and part of the expert's/teacher's duty in a traditional classroom that limits students to be autonomous learners. It allows students to have a choice. It gives students the opportunity to choose learning activities that work for them, and this enhances their motivation and engagement for learning. Besides, it can satisfy the needs of particularly adolescent and adult learners as they want and need to be in control of their learning so that technology can provide a supplement to the classroom and is crucial to develop students' skill which is not given attention in the traditional classroom. However, skill building is vital in manipulating technology and connecting to the world in this 21st century.

In the chapter, the three stages—the pre-industrial age, the industrial age, and today's information ages––are also highlighted. The more students get information, the more capable workers they will be for the future, but this requires some form of change in the secondary and post-secondary schools. Hence, there should be a paradigm shift from pedagogy to andragogy. The authors, stating Malcolm Knowles (1913–1997), a pioneer and leader in the area of adult education, explain the distinction between pedagogy which is about the education of children, and andragogy, the training of adults. They stated that the training of adults implies that learning should be more tailored to accommodate the career objectives or life goals of the adult. In general, in this diversified and competitive world, one size-fits-all instruction does not make all students successful and lifelong learners. Consequently, some learning types must be individualized. This idea resembles Tomlinson's (1999) notion of differentiated instruction (DI). Nowadays, there is a need to shift from one-size-fits-all to differentiated, individualized instruction as there is variability among any group of learners around the world.

2.2 Chapter Two: The Educational Technology Solution

This chapter emphasizes the necessity of educational reform (the use of technology) to alleviate learning difficulties since today's students are more diverse than the previous generations. Tomlinson (1999), a pioneer in DI, also explains that these days, the level of diversity rivals the ancient one. The classroom is more diverse, inclusive, and plugged into technology than ever before. Therefore, there is a need to revisit the education system to have an individualized system for each student. The individualized program targets the strengths, weaknesses, talents, and interests of students. It allows students to plan their realistic objectives (set specific goals). Students read books of their interest. Likewise, they can learn, through technology, based on their interests, needs, and readiness. The use of technology can assist students to be motivated, engaged, and analyzers of what they learn from broader perspectives. This helps to make their learning fruitful and lifelong. Technology assisted individual learning is particularly good for chronically underachieving students as many of them are left out of the learning process due to several reasons. In general, technology can be used as a means to assist classroom instruction through knowledge development for low and high-achieving students and through skill building of technological and vocational skills by having students practice with real-world cases of these skills.

2.3 Chapter Three: An Individualized Plan Based on Types of Memory

The third chapter highlights the significance of individualized instruction for each student. There are two options, tutorial and distance learning to address the unique needs of students anywhere, any time. Since

learning is a process of integrating something into the memory system, building a three-part individualized program based on the three types of memories could be an ideal way to structure the plan. The three memories––semantic, episodic, and procedural memories—located in different parts of the brain are neurologically connected. Optimal learning utilizes all the three types of memories although school learning tends to focus primarily on memory for knowledge. In the chapter, general intelligence related to IQ which measures linguistic and mathematical intelligence of students for a long time and the pluralized nature of intelligence are stated. Gardner (1983), in his first book, explains that intelligence is not static and students have different ways of acquiring knowledge. There are seven or more ways of reflecting knowledge/solving problems that all people possess: linguistic/verbal, logical/mathematical, visual/spatial, bodily/kinesthetic, interpersonal, intrapersonal, and musical. He also added other intelligence, naturalistic and existential. The presence of these bits of intelligence indicates that there are many ways to be smart. Some people may have strong verbal, moderate musical and low logical intelligence while others could be the opposite. It is like a bunch of computers in mind that works very well, average, and low. Thus, there is a need to individualize instruction and present materials in multiple ways, at least pluralize it in more than one way.

2.4 Chapter Four: Improving Learning: "Lower Brain"

This chapter explores the psychological Theories of behaviourism. It explains that rewards and punishments affect learning, but this is not well-recognized in formal education settings. A learning plan that is individually prescribed, self-paced to each student can help make the rewards for learning more easily known by the brain and improves learning. The theory's conception of reward can be applied in formal education settings to engage students in different activities although this theory has flaws of considering learning out of mind and thinking of students as passive learner. Concerning this, as Ingvarsson and Morris (2004) explained, the theory of behaviourism is unable to deal with complex human behavior. However, the notion of positive reinforcement (rewards) deals with the concept of motivation and negative reinforcement technique as prevention of undesired behaviour. Therefore, behaviour modification is a process of administering specific rewards to teach certain behaviours which is an effective lesson drawn from this theory and has proved to be effective means to teach developmentally disabled students.

2.5 Chapter Five: Improving Learning: "Higher Brain"

Behaviorism's concept of reward is essential for enhancing the intrinsic motivation of an individual. Cognitive psychologists strongly believe that there are other things that impact human learning apart from rewards and punishments. Humans do not just passively learn according to environmental events; they actively seek to control and manipulate the events in their lives. These controlling factors can have a major impact on students' success. Humans can ask and reason out. Cognitivism states that all human beings have innate abilities which help them as a stepping stone for further learning. The theory acknowledges that students' prior experiences help them to construct meanings. Hence, for cognitivists learning is beyond observable behaviour. It is an internal mental activity and it should be away from memorizing simple facts. The focus should be on ensuring that every student construct meanings and get knowledge from what he/she learns. This can be achieved through the ability to control one's learning, or the desire to learn or through Meta cognition and motivation.

2.6 Chapter Six: Enhancing Attention and Perception

As stated above, in the constructivist philosophy, students construct their meanings by relating what they learn to their previous background knowledge. During brainstorming, teachers advise students to pay attention to the lesson and brainstorm what they knew before. Although enhancing students' attention and perception is a difficult task, they are essential to be successful in learning (to retain learning). The terms paying attention and having a positive perception are also highlighted in noticing hypothesis, which states that input cannot be taken in, particularly for language learning, unless noticed or students learn a lot when they value and give due attention to something that they do not (Schmidt, 2001). About perception, young learners spend more time with technology than old learners do. Nevertheless, there is a need to introduce technology during the adolescent years and continue throughout life.

2.7 Chapter Seven: Promoting Better Memory and Assessment

In this chapter, as stated in chapter six above, giving attention to learning helps to remember and remembering is as important as the initial learning. This is because learning that cannot be recalled has very little significance and improving on this process can be a very important part of individualized learning through technology. For remembering and retaining information in the long-term memory, enhancing memory is needed. Distinctiveness (the quality of being different) is one way of improving memory. When information is presented in novel ways, memory is improved. Besides, meaningfulness which refers to the ability of new learning to fit into prior learning is another means of promoting a better memory. Also, mnemonics and stories play their roles in enhancing memory. When students get older, their recalling ability decreases. However, employing recognition tests which contain contextual clues can improve recalling and testing.

2.8 Chapter Eight: Enhancing Knowledge Formation

The chapter states that one way of enhancing knowledge is through developing cognitive skills. Concept learning is a vehicle for promoting this skill. This higher-order thinking comes from the manipulating of the concepts, rules, and principles within semantic knowledge. For this reason, the study of key concepts is fundamental to understand different subjects. The best way to understand a concept is through learning the concept attributes and association. However, for abstract attributes, providing exposure in different contexts/ making contextualized is essential for deeper understanding.

2.9 Chapter Nine: Providing for Experience, the Best Teacher

Children at early age learn everything from their surroundings through their senses. To enhance this knowledge, it is good to expose them to actual real-life experiences. This could be done by using real classroom objects or by preparing pictures and different locally available materials. This is how they explore the world and get meaning out of it so that their feelings, beliefs, and attitudes to learning can be developed though visual and experiential learning. These days, real classroom environments could be enhanced using technology-based kind of instruction. Technology also allows students to try out different vocational and other skills, which have a significant impact on improving their future life after they finish school.

2.10 Chapter Ten: Cognitive and Technological Skill-building

As stated above in chapter nine, providing rich and realistic experience is essential to master what students learn. This is the result of the development of their cognitive skills. Apart from cognitive skills, they also need technological skills to solve problems and to develop critical skills in schools and beyond, as stated in chapter ten. Knowledge of technology enables them to flourish in their formal education and future life.

Conversely, children who are poor in using technology will be left behind the digital revolution. This in turn has debilitating consequences on their academic and non-academic activities. In this 21st century, technology plays a key role in our day- to-day activities and it is a necessity to develop technological skills.

2.11 Chapter Eleven: Applications for Cognitive and Technological Skill-building

This chapter emphasizes the role of technology to promote students' cognitive (Meta cognitive), technological, and other vocational skills through extensive practice using computers. The more students interact with computers, the better chance they have to get immediate feedback. This allows them to reflect on their responses and it is particularly essential when tasks are beyond their current level of proficiency. When they get the opportunity to tackle complex tasks, their mechanical skills such as drill-and-practice, simulations, games, reflective buggy models, artificial intelligence, cognitive skills, and intrinsic motivations boost.

2.12 Chapter Twelve: Individualizing Instruction

As the title of the book is about individualizing instruction, this chapter explains the relevance of individualizing instruction by presenting prominent figures like Abraham Lincoln and Socrates. They developed much of their knowledge and their view of the world through an individualized or independent learning rather than through formal, face to face kind of education. It states that students come to class with different linguistic backgrounds, interests, motivations towards the subjects they learn and so many other differences that can differentiate them as individuals. To accommodate these diversified needs of students, first teachers must know their students and should plan lessons accordingly.

2.13 Chapter Thirteen: Applications for Individualized Instruction

The final chapter explains that tailoring instruction to meet the needs of everybody is a daunting task for teachers. However, it is possible to realize this through scanning environments and mainly using media and computer-based kind of learning such as internet/ virtual learning, distance learning, and computer-assisted instruction (CAI). A variety of topics could be presented without teachers necessarily spending too much time of their time and resources. Hence, if there is commitment on the part of teachers, it is possible to apply individualized instruction.

3. Strengths and Weaknesses of the Book

3.1 Strengths

As the title implies, the book states the importance of addressing the diversified needs of students particularly high school students, through individualized technology-based instruction. One of the reasons that instigated to review this book is we are living in the age of the pandemic, Covid-19. Nowadays, technology-based individualized instruction is not a matter of choice. However, it is mandatory since it is the sole means of reaching students almost throughout the world due to the pandemic apart from being supplementary to face-to-face learning and doing different business and social activities. In addition, the book is vital in a sense that it encourages teachers to teach based on students' individual capabilities and interests. If schools, colleges and universities plan lessons to fit the individual needs of every student, hopefully everyone will benefit from education and will be successful in life.

The book is interesting and informative to anyone particularly teachers all over the world and educational experts can easily read and understand it. It can be used as a means to promote informal education and strengthen formal education so that students can be motivated and engaged when their specific needs are

addressed during face-to-face teaching or through distance modality using their technological equipment. Although the book particularly focuses on tailoring the instruction to meet the needs of high school students, it can be adapted to different levels; the ideas are good.

3.2 Weaknesses

The book pays due attention to make individualized instruction possible through presenting technology as an alternative solution to teacher-fronted kind of instruction which is good as the authors presented in the title of the book. I believe the title and the conclusions are the same. Nevertheless, the book has certain limitations in providing practical examples of how individualized instruction would be feasible in remote places and in developing countries where there is a scarcity of computers, media and smartphones, and even electricity.

4. Conclusions

To wind up, the book explains the relevance of tailing instruction to meet the individual needs of students who are different in many ways. It favours technology-mediated instruction to achieve quality and equity in education. Therefore, it is recommended for anyone and particularly for teachers to address the diversified needs of students through technology-assisted instruction. This helps students to be independent learners throughout their lives and thereby increases their creativity, problem-solving skills, and motivations to learn.

List of Abbreviations

CAI: Computer-Assisted Instruction

DI: Differentiated Instruction

IQ: Intelligent Quotient

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