



## IT Applications in Education and Self-Directed Learning Capacity

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### Abstract

*In the realm of differentiated teaching methods in Vietnam, educators predominantly prioritize the cultivation of intellectual prowess, as evidenced by its exclusive emphasis on academic performance as reflected in report cards. The failure to adequately consider psychological and cognitive factors has been found to significantly impede the effectiveness of differentiated teaching practices within the high school education system in Vietnam. The integration of technology in educational settings has proven to be a valuable tool for educators, facilitating the expeditious preparation of lessons through the utilization of pre-existing lecture templates. Moreover, this innovative approach empowers teachers to harness a myriad of resources, including videos, images, and electronic documents, to captivate learners and enhance the overall efficacy of their instructional practices.*

## Introduction

The widespread use of IT applications has brought about tremendous transformations in the field of education, paving the way for significant advances (Strielkowski et al., 2021). Their impact on the field of differentiated instruction, a pedagogical paradigm that adapts teaching strategies to meet the needs of students with widely varying levels of background knowledge and skill, has been particularly significant (Griful et al., 2021). According to inclusive education theory, which emphasizes the need for classrooms to be flexible enough to accommodate students with a wide range of abilities, backgrounds, and learning styles, this method is appropriate.

There is an urgent need for revolutionary changes in today's educational institutions, and have resoundingly reiterated this call (Modiba, & Ntshangase, 2021). By using innovative instructional techniques and tactics, educational advocates stress the critical need of respecting students' unique cultural and social backgrounds (Baena et al., 2023). Differentiated education has developed as a potential pedagogical strategy for meeting the wide range and complexity of student requirements (Webb et al., 2019). Research to date suggests that this approach shows promise in providing individualized learning experiences that can accommodate a wide variety of student needs and preferences.

For this purpose, the literature review that follows focuses on a set of sixteen academic articles published during the previous decade (Kraus et al., 2020). These research projects explore the complex field of differentiated teaching, with a focus on the use of this strategy and its impacts in higher education. When taken as a whole, these studies help shed light on the revolutionary potential of individualized teaching in the classroom (Cummins, 2021). Analyzing all of these research together yields a wealth of knowledge that clarifies the many advantages and significant difficulties of using differentiated education (Lowe et al., 2021). Using the

pedagogical approach not only gives teachers more leeway in how they deliver lessons, but it also increases students' engagement, which in turn boosts their academic performance (Geverola et al., 2022).

Despite the growing body of research on individualized teaching, there is still a significant gap in our understanding of how to put it into practice in specific locations (Hays et al., 2020). Research on the benefits of using tailored teaching in a broad range of educational settings has seen a significant uptick in recent years. It is important to note, however, that studies examining the implementation and results of differentiated teaching in Greece are noticeably few. Research on the possible effectiveness of adapting curriculum to meet the unique needs and circumstances of the Greek higher education system finds rich ground in the paucity of academic study inside this system (Howard & Khalifeh, 2020). We may gain a more nuanced understanding of differentiated instruction and its utility in different settings of education if we investigate its potential and the effects of implementing it in Greece (Ames et al., 2021).

This scholarly work introduces an innovative strategy for encouraging students to take charge of their own education (Mamajanova, 2020). Fundamental to this approach is the development of a thorough categorization system for identifying and grouping students according to their specific educational needs and interests (Lähnemann et al., 2020). The individualized approach aims to provide students with targeted help so that they may engage in self-directed learning activities that are in tune with their particular cognitive preferences and strengths (Kasneji et al., 2023). This cutting-edge strategy aims to maximize the benefits of differentiated instruction and the use of IT applications in the classroom.

## Literature Review

In order to accommodate the diverse needs of students with differing backgrounds, interests, and ability levels, educators have increasingly embraced the concept of differentiated instruction (DI). The discipline of Design Intelligence (DI) research has amassed a substantial amount of data that provides evidence of the effectiveness of its methods. Valiandes (2015) performed a comprehensive study to get a deeper understanding of the favorable effects of Direct Instruction (DI) on students' academic performance. The academic performance of students who were exposed to Differentiated teaching (DI) tactics surpassed that of their counterparts who did not get personalized teaching, underscoring the significance of including DI strategies in educational settings. These distinguished academics have consistently presented empirical evidence showcasing the advantages of Direct Instruction (DI) across various educational environments. Scholarly research has shown that Direct Instruction (DI) has a significant and positive impact on students' academic achievement, particularly in domains such as reading fluency and comprehension.

The proactive efforts of educators play a key role in the success of Differentiated Instruction (DI). Consequently, much study has been conducted to examine the strategies and frequency used by educators in implementing instructional differentiation.

Table 1. Overview of Relevant Studies on Differentiated Teaching

Authors	Year	Content and Results
Tomlinson	2000	Differentiated teaching as a mindset for understanding learners.
Cox	2008	Transformative impact of DI on knowing learners' capacities.
Levy	2008	Utilizing DI tools to provide equitable education for all learners.

Graham, Morphy, Harris, et al.	2008	Need to explore teachers' differentiation practices in detail.
Jenek, Gronostaj, and Vock	2019	Lack of theoretical consensus on DI conceptualization.
Suprayogi, Valcke, and Godwin	2017	Wide array of DI practices, yet critical need for implementation.

Differentiation is an instructional methodology that acknowledges the individual strengths and limitations of students, and then customizes the teaching process to cater to their specific needs. This collective encompasses individuals of all ethnic backgrounds and varied life experiences who encounter difficulties within the educational setting. The instructional approach under consideration was devised with the aim of fostering a classroom environment that promotes the growth and progression of students throughout the duration of a year, semester, or even a single day.

The need for educators to possess a profound understanding of their students is underscored by the triumph and extensive implementation of differentiated instruction. Differentiated education encompasses more than a single instructional approach. Instead, it represents a significant break from conventional perspectives on students, pedagogical approaches, and the nature of education. It is important for educators to implement modifications within their classroom environments in order to facilitate a deeper comprehension among pupils regarding their own capabilities, inclinations, interests, and requirements. Using a variety of instructional methodologies is a means of upholding the principles of equitable education, so ensuring that every student has the opportunity to achieve their maximum potential.

The current state of research is both stimulating and illuminating, however it also underscores many significant obstacles and deficiencies. The need of conducting a thorough investigation of the instructional strategies used by educators in order to distinguish their teachings, particularly at the macroscopic level. Despite the extensive body of scholarly research and the intricate nature of current models, a universally accepted theoretical framework for delineating DI remains absent. The use of Differentiated Instruction (DI) methodologies within educational settings has significant significance. It is emphasized that the successful implementation of instructional strategies is of utmost significance, notwithstanding the existence of several alternative approaches.

### **SDL capacity by differentiated teaching**

Table 2. Criteria for Estimating Student SDL Capacity in Graphic Software Teaching

<b>Criteria</b>	<b>Manifestation in Graphic Software Module</b>
Identify learning goals	<ul style="list-style-type: none"> <li>- Ability to utilize basic functions of graphic design software.</li> <li>- Creation of practical digital products (logos, banners, etc.).</li> <li>- Establishment of goals tailored to individual students' needs.</li> <li>- Clarity in defining goals for specific topics and tasks.</li> </ul>

Identify learning task	<ul style="list-style-type: none"> <li>- Active engagement with classroom tasks and exercises.</li> <li>- Hands-on experience with various graphic design software.</li> <li>- Expansion of knowledge through additional readings and online searches.</li> <li>- Task identification based on attained results.</li> </ul>
Identify learning resources	<ul style="list-style-type: none"> <li>- Proficient use of computers and graphic design software.</li> <li>- Efficient information search for required graphic products.</li> <li>- Selection of suitable information for the project.</li> <li>- Utilization of open learning resources to enhance knowledge.</li> <li>- Collaboration through digital platforms like Padlet, Google Drive, etc.</li> <li>- Flexibility in choosing project location (school/home).</li> </ul>
Identify learning strategy	<ul style="list-style-type: none"> <li>- Creation of a detailed schedule with allocated resources.</li> <li>- Documentation of acquired knowledge.</li> <li>- Self-learning through personal work and feedback.</li> <li>- Regular evaluation and adjustment of learning plan.</li> </ul>
Assessment	<ul style="list-style-type: none"> <li>- Employment of assessment tools (checklists, rubrics) for process.</li> <li>- Reflecting on adherence to the learning plan.</li> <li>- Focusing on concentrated knowledge.</li> <li>- Evaluation of task completion level.</li> <li>- Identification of improvement areas and formulation of enhancement plan.</li> <li>- Outcome assessment based on applied knowledge and task completion.</li> </ul>

The table provided above presents a comprehensive overview of the many factors that may be used in assessing students' ability to engage in self-directed learning (SDL) within the specific context of graphic software training. The aforementioned criteria provide a comprehensive structure for assessing students' ability to actively engage in their own educational pursuits within this particular field of study. Each criterion delineates the anticipated results of self-directed learning within the broader framework of the module.

The capacity to identify and articulate learning objectives is of utmost importance when evaluating students' self-directed learning proficiency within the graphic software module domain. The objectives include acquiring proficiency in graphic design tools to generate banners, logos, and other valuable digital artifacts of a professional standard. Furthermore, educators emphasize the need of pupils establishing personalized objectives that align with their unique needs and interests. The establishment of explicit objectives for each project underscores the significance of possessing a comprehensive comprehension of the requisite knowledge and skill sets necessary for the effective completion of such project. Differentiated instruction aligns with the aforementioned approach, which prioritizes the delivery of personalized learning opportunities.

Furthermore, the skill of selecting suitable educational tasks is of utmost importance in fostering students' ability to engage in self-directed learning. The kids actively engage in their education by diligently completing both in-class and extracurricular tasks. This area encompasses the innovative utilization of diverse graphic design software tools and the systematic approach to knowledge advancement via supplementary reading and extensive online investigation. The evidence suggests that students possess a remarkable capacity to

modify their learning practices based on their performance, so exhibiting a self-directed approach that aligns with the tenets of autonomous learning.

The examination of students' critical thinking abilities encompasses many variables, including their proficiency in successfully using computers and graphic design tools, their ability to acquire information in a prompt and efficient manner, and their aptitude for selecting pertinent facts for academic pursuits. Digital platforms such as Padlet and Google Drive facilitate a collaborative environment by enabling seamless sharing of resources and fostering active participation from both educators and learners. The ability for students to complete assignments at a location of their choosing, whether it at school or at home, confers a significant advantage in terms of convenience and flexibility. The concept of self-directed learning, The contemporary focus on the significance of adaptable and autonomous resource allocation.

The proficiency shown by students in formulating strategies for their own educational pursuits serves as another substantiation of their aptitude for engaging in self-directed learning (SDL). It is strongly advised that individuals engage in the practice of developing comprehensive exercise and homework routines, maintaining meticulous documentation of acquired knowledge, and conducting self-assessments to gauge personal advancement. During this transformative journey, students engage in a dynamic process of enhancing their learning strategies via the valuable guidance and constructive comments provided by esteemed faculty members and other peers. Engaging in the assessment and adjustment of one's learning technique demonstrates a self-regulated approach to acquiring information.

In self-directed learning, both the process and the product of learning evaluation have equal significance. By using assessment tools such as checklists and rubrics, students are able to engage in self-reflection on their educational progress, identify areas of weakness, and develop strategies for improving their performance. The assessment and introspection of an individual's comprehension of graphic design software is a crucial component inside the whole procedure. This involves recognizing the potential applications of this information across many contexts, as well as identifying areas where information is acknowledged but not yet used. The strategy described above not only promotes the development of self-directed learning, but also places emphasis on the cultivation of metacognitive awareness and the pursuit of advancement in all aspects of one's educational journey.

### **ICT applications in education for differentiated teaching method**

The extensive integration of technology in educational settings has led to notable transformations in teaching and learning methodologies. The advent of digital technologies has resulted in the emergence of shared databases that facilitate collaborative searching and use by groups of students within educational settings. Within the realm of education, modern educators possess the remarkable capacity to effortlessly disseminate a diverse array of educational resources, including literature, instructional sessions, and meticulously crafted multimedia presentations replete with valuable knowledge. Google Drive is a very versatile and user-friendly platform that facilitates the seamless uploading and storage of data. Additionally, it offers a streamlined system for categorizing these files into separate folders. In addition to its diverse sharing capabilities, the application also has a comprehensive search functionality, facilitating effortless retrieval of desired information. For instance, one may provide designated email accounts for individuals to use, facilitate sharing throughout the whole organization, or encourage the dissemination of links via interpersonal communication. In addition, Microsoft's OneDrive offers a simplified synchronization approach that facilitates the successful cohabitation of PC and cloud storage. The establishment of this link facilitates the seamless synchronization and retrieval of users' data across all their interconnected devices,

hence enhancing their overall efficiency and user experience. Moreover, FreeCommander, a versatile software solution, has garnered acclaim for its remarkable efficacy in managing compressed files and its user-friendly hierarchical organization. The remarkable advantages of the program include its seamless data synchronization facilitation and excellent data administration.

In contemporary educational contexts, the conventional parameters of teacher-student interactions have significantly expanded. The advent and widespread availability of Internet materials has significantly transformed the educational landscape, affording educators and learners more flexibility by eliminating the limitations imposed by traditional brick-and-mortar classrooms. The use of online discussion boards and study groups has resulted in an augmentation of options for active engagement and the establishment of a more comprehensive and intellectually invigorating educational environment. The advent of this groundbreaking form of communication has fundamentally transformed the landscape of education, promoting a collaborative and interconnected approach to learning. Students from diverse backgrounds, including those with non-traditional learning preferences that extend beyond conventional textbooks, derive significant advantages from the effective incorporation of technology in educational settings. This integration enhances their level of engagement and enables them to pursue their studies in a manner that aligns with their individual needs and preferences. The growth of online discussion boards and class groups has provided students with a dependable method of continuous connection. This innovative approach facilitates the cooperation between students and teachers by enabling students to engage in meaningful discussions outside the confines of the classroom. The emergence of online forums has played a pivotal role in fostering the exchange and deliberation of novel ideas and information among students. In virtual learning environments, students have the ability to engage in knowledge exchange and provide assistance to their peers on assignments and inquiries, hence facilitating collaborative learning experiences (suggests that there exists potential for improvement in collaborative efforts and technological use. Nevertheless, it is important to use caution in order to avoid diminishing the invaluable face-to-face interactions. In a recent paper, the need of taking into account the technological proficiency and usability for both instructors and pupils. The efficacy of online communications is contingent upon this key factor.

Currently, there exists a considerable amount of scholarly attention around the notion of diverse learning styles. Individuals that exhibit a preference for visual learning possess an enhanced capacity to acquire and apply information via the use of visually appealing materials. These individuals may exploit this advantage by fully using the array of instruments provided by contemporary technology. The satisfaction of users' desires for visual information may be achieved by the use of digital resources that include graphical elements, photographs, and videos. Individuals who possess a preference for tactile learning, characterized by a propensity to acquire knowledge via physical engagement, are fortunate to have a plethora of cutting-edge resources available within the realm of educational pedagogy. Tactile gloves and interactive displays exemplify advanced technological solutions that have the potential to enhance the accessibility of tactile learning. These state-of-the-art gadgets enable users to actively use their tactile sense in order to enhance memory retention and comprehension. The light on the potential of intelligent interactive displays in facilitating the learning process for tactile learners, enabling them to develop a deeper comprehension of shapes and the functionalities of objects. The study revealed that the incorporation of three-dimensional blocks into the interactive interface resulted in a noteworthy enhancement in participants' knowledge and interest pertaining to the subject matter. This finding underscores the need of using advanced technological resources to cater to diverse learning preferences and foster a more

comprehensive educational setting. Individuals who are visual learners exhibit certain cognitive preferences. In light of these findings, the researchers propose that the use of infographics and interactive simulations might potentially cater to the unique demands of visual learners.

Contemporary educational resources may facilitate optimal learning experiences for kids who are most receptive to auditory stimuli. The use of lesson screen recordings, which provide several opportunities for auditory information assimilation, seems to be very advantageous for this particular population as they promote active engagement and understanding. Auditory learners derived the most advantage from repeated exposure to course content. This finding provides more evidence supporting the efficacy of using recorded lectures and discussions as an instructional resource. Technology plays a crucial part in enabling both synchronous and asynchronous audio-based conversations, which they assert is an efficient method to cater to the auditory learning style's inclination towards verbal engagement. According to Edwards and Jones (2019), individuals who possess an auditory learning preference may get significant advantages from consuming instructional content in the form of podcasts. This platform offers a versatile and user-friendly tool for acquiring knowledge and expanding one's intellectual horizons. The need of including high-quality audio and effective organization of auditory material to optimize learning outcomes for this particular group.

The field of education has seen a significant transformation with the emergence of novel pedagogical methods facilitated by the extensive use of Information and Communication Technology (ICT) applications. The use of digital platforms for the purpose of disseminating educational content, along with the widespread adoption of technology, has significantly expanded the scope and depth of educational possibilities. The use of technology-enhanced instructional approaches has the capacity to establish an inclusive and efficacious educational environment that caters to students with diverse learning preferences. Further investigation in this domain would greatly benefit from a more comprehensive examination of the impact of diverse technological tools on students' educational achievements. Additionally, it is essential to devise effective approaches that facilitate educators and learners in optimizing the use of technology to enhance their educational encounters inside the classroom setting.

## **Conclusion**

The use of technology into educational methodologies has shown its efficacy as a valuable resource for educators. By using established lecture forms, teachers are able to optimize their time spent on class preparation. Simultaneously, the integration of multimedia elements like as films, photographs, and electronic documents provides educators with an expanded range of instructional resources. These educational resources not only capture the attention of students but also enhance the overall effectiveness of teaching methodologies. The educators' capacity to effectively use IT resources for instructional purposes and evaluation inside the classroom setting is very remarkable. Educators have the potential to enhance students' learning outcomes in the realm of information technology via the strategic use of existing resources in the area of information technology. Moreover, these individuals possess the necessary knowledge and skills to conduct a thorough analysis and proficiently use the diverse range of information technology resources at their disposal, so guaranteeing optimal efficacy in the realm of assessment endeavors.

Furthermore, it is imperative to sustain a steadfast degree of dedication throughout the whole of an educational trajectory in order to facilitate the proficient execution of personalized instruction. The proposed methodology demonstrates a remarkable alignment with educational settings tailored for children exhibiting advanced cognitive capabilities. The primary objective



of this initiative is to effectively categorize children into groups according to their standardized test scores and other indicators of academic achievement. The main objective of this setup is to enhance students' capacity to acquire new knowledge and skills.

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