

Exploring Learning Style and Learning Outcome of Students at Polytechnic Sultan Idris Shah

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Abstract

The evaluation of a student's learning style has significant importance within the realms of pedagogy and the acquisition of knowledge. The categorization of learners' styles may be advantageous for educators as it aids the creation of teaching and learning approaches as well as the design of environments that suit each student's needs. This study aims to identify preferable Kolb learning styles and assess the impact of Kolb learning styles on learning outcome. The research subjects consist of eighty students who have been enrolled in the research. The current study utilizes quantitative survey-based methodologies for data collection. The instrument used in this study included the Kolb Learning Style questionnaire. The acquired data underwent statistical examination using descriptive analysis and linear regression techniques. The findings show that Diverger's learning style is more common among the research subjects. Furthermore, this study also revealed that the learning style had little impact on the learning outcome (CGPA). Hence, it is imperative to undertake additional research about various elements that could impact students' academic achievements. This study's findings revealed the need to incorporate educational activities that align with different learning styles into the pedagogical approach, facilitating academic achievement for all students.

Keywords: Kolb, Styles, Approaches, Instruction, Academic, Outcome

Introduction

Understanding how students learn and absorb information is critical in education for designing effective teaching and learning environments. The concept of learning styles is a well-known framework that has been widely explored and utilized in educational contexts (Akbar & Nasution, 2021; Rais et al., 2018). Individual preferences and tendencies that impact how students perceive, a process, and retain knowledge are learning styles. Educators can customize their educational approaches to better meet the requirements of diverse learners by identifying and accommodating these preferences. Each student has an individual predisposition toward certain learning styles, techniques, and degrees of learning (Ariastuti & Wahyudin, 2022). Additional research finds that academic achievement is influenced by

multiple learning styles, highlighting the need to evaluate each student's distinctive learning styles. The present study employed the Kolb Learning Style basis to explore students' learning styles. Understanding students' learning styles using the Kolb model can give educators significant insights (Aljaberi, 2015; Willingham et al., 2015). Educators can create more exciting and compelling learning experiences by adapting instructional approaches, activities, and evaluations to students' preferred learning styles (Alshammari & Qtaish, 2019; Li et al., 2019). However, it is crucial to focus that learning styles are only one component of the complicated learning process, and their impact on student results is currently being debated and researched (Akbar & Nasution, 2021; Mozaffari et al., 2020).

Therefore, it is essential to find more efficient ways of teaching and accommodating different styles of students through a learning environment that they prefer. The learning styles model acknowledges that students learn in various ways even though there are a variety of general concerns connected to learning styles. Nevertheless, students may encounter learning difficulties when they lack a suitable learning style. Students find it more challenging to understand the subject or course when there is no alignment between their preferences of learning and the instructional activities and techniques that lecturers utilise, which may lead to difficulties in the learning process (Lingua, 2021). Consequently, students experience a decline in engagement and focus, leading to subpar exam performance, less interest in specific courses, and, ultimately, a propensity to abandon their academic pursuits (Kharb et al., 2013). Therefore, it is vital to examine how students acquire knowledge to improve the comprehension of their individualized learning preferences and foster their academic achievement (Dimkpa, 2015; İlçin et al., 2016). On the other hand, using insufficient and ineffective learning approaches during instructional sessions is expected to lead to reduced academic accomplishments among pupils. The evaluation of student learning outcomes and the subsequent improvement of learning are of greatest importance in higher education (Eshete, 2022; Rais et al., 2018). The rationale for assessing learning outcomes is to use data to showcase how students can attain educational goals. The cumulative grade point average (CGPA) continues to be a significant factor and a crucial determinant in accessing career prospects. Graduates' substandard academic achievement increases rivalry among them. Thus, a study to analyse the Kolb learning style preferences and assess the impact of students' learning styles on their CGPA is needed. This study will add to the continuing debate about the relevance of learning styles in education and provide insights for educators and instructional designers to improve teaching practices and student learning experiences.

Literature Review

The literature review begins by examining the concept of learning style and the significance of learning style models in an educational context, specifically focusing on the Kolb learning style model. Additionally, the review explores the relevance of students' learning outcomes and investigates the connection between learning styles and students' academic achievements. The exposition of the literature review is elucidated in Figure 1.

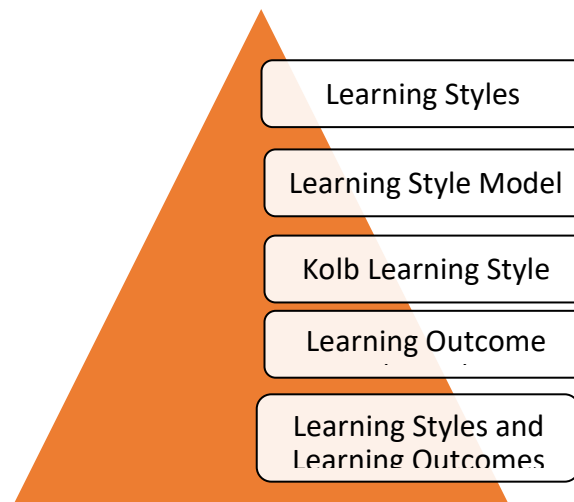


Figure 1

Overview of Literature Review

Learning style preferences have been identified as significantly impacting learning, and academic performance, shedding light on how students acquire knowledge. All students can acquire knowledge, albeit through distinct learning modalities (Shah et al., 2013). The various methods of acquiring knowledge, commonly known as learning styles (Akram Awla, 2014). Recent scholarly research has underscored the importance of identifying and comprehending students preferred learning styles. However, complications develop when discrepancies between learning styles and teaching styles exist (Tulbure, 2012). This phenomenon may result in a rapid onset of fatigue among students, leading to decreased attentiveness during class sessions, suboptimal performance in examinations, and, occasionally, instances of academic underachievement. Therefore, a more profound comprehension of students' learning styles by teachers might enhance their ability to assist learners effectively (Eshete, 2022; Yazici, 2016). For teachers to effectively tailor learning activities to accommodate their students' preferred learning styles, they must comprehensively understand their learners' individualised learning processes (Dimkpa, 2015). Researchers and scholars, including Felder & Silverman, Dunn & Dunn, Honey & Mumford, and Kolb's, have introduced various learning style models (Dantas & Cunha, 2020; McCarthy, 2010). This study will employ Kolb's experiential learning style, widely recognised as one of education's most prominent learning styles (Kolb & Kolb, 2005). Within the framework of this study, the learning outcome is centred on students' cumulative grade point average (CGPA).

Numerous researches have offered empirical evidence to substantiate the correlation between Kolb's learning styles and educational achievements (Ariastuti & Wahyudin, 2022; Ha, 2021). A prior study showed that students with varying learning styles exhibited significant variations in their learning outcomes. The researchers concluded that educators could utilise these research findings to develop instructional materials and serve as a valuable resource for designing mobile media materials that are meaningful and effective in educational settings (Fan et al., 2015; Rais et al., 2018). Furthermore, there was a notable impact on academic performance in the context of inductive guided inquiry learning due to varying learning styles was also found (Sudria et al., 2018). Notable disparities in learning styles and behaviours were revealed through this study, which found that there is an association between the utilisation of various learning styles and students' academic

achievement (Alshammari & Qtaish, 2019; Magdalena, 2015; Munir, 2021). While These results suggest a positive correlation between Kolb's learning styles and academic achievements, the literature review found that some studies have found no significant association between learning styles and learning outcomes (Hidayati et al., 2021; Putri et al., 2019). Therefore, it is essential to consider individual differences and the influence of other factors, such as instructional methods and learning environments. In addition, some researchers argue that the association between preferences for learning and educational achievements may be more complex and context-dependent, necessitating additional research. Consequently, this research aims to identify the Kolb learning styles among students and will investigate the following research question: Does learning style influence the learning outcome of students?

Theoretical Framework

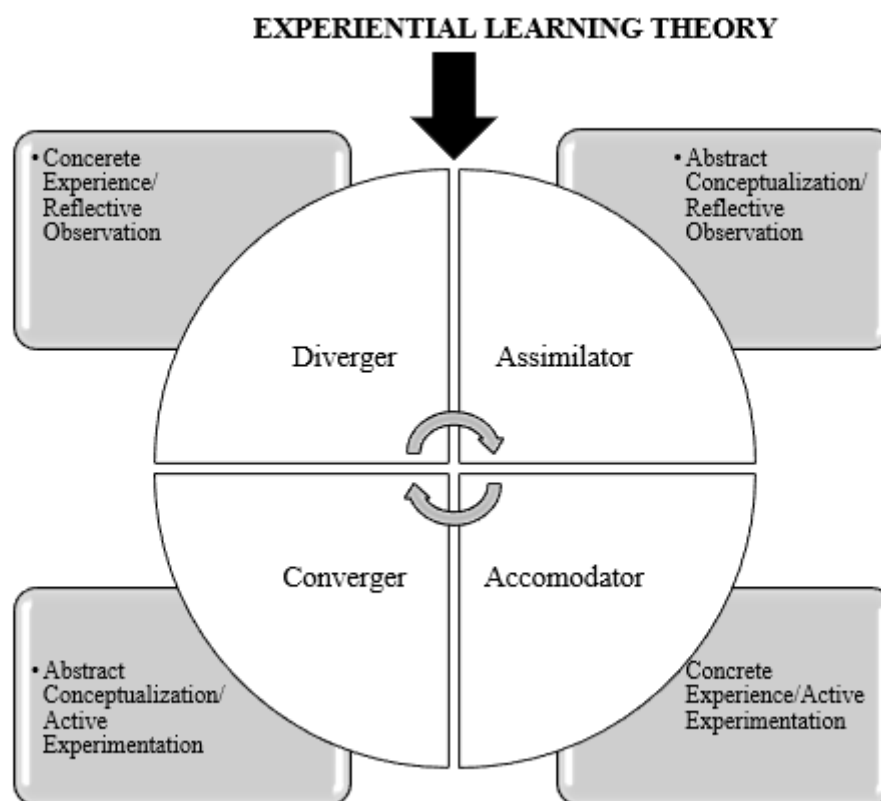


Figure 1

Theoretical Framework

The study is grounded in the theoretical framework of Experiential Learning Theory. The theory, proposed by David Kolb, presents a comprehensive perspective on learning that places significant emphasis on the value of personal experience and reflection (A. Kolb & Kolb, 2017; McCarthy, 2010). The learning process is enhanced by a perpetual sequence of concrete experience, reflective observation, abstract conceptualization, and active experimentation as in Figure 1. The experiential learning hypothesis posits that each stage of the learning cycle holds significant importance (Idris et al., 2020). The Concrete Experience stage entails actively participating in a tangible real-world experience or confronting a specific event that serves as the fundamental basis for learning (Idkhan & Idris, 2021; Idris et al., 2020; A. Y. Kolb & Kolb,

2005; Muro & Terry, 2007). The potential options for engagement include a tactile activity, an applied assignment, or an immediate engagement with the surroundings. Learners in the Reflective Observation stage reflect on their experiences and carefully observe the results that arise from those experiences. Learners actively seek patterns, insights, and connections during this stage to deepen their understanding. Reflective observation facilitates the process by which learners critically assess their experiences and gain a deeper understanding of the underlying meaning or importance inherent in those encounters. During the Abstract Conceptualization stage, learners engage in the creation of abstract concepts, theories, or models that are derived from their reflective observations. Scholars formulate theories or frameworks that elucidate observed patterns and relationships, establishing connections between their empirical findings and more comprehensive conceptions and principles. Individuals actively applying abstract conceptualizations through testing them in novel scenarios or contexts in the Active Experimentation stage. Individuals apply their acquired knowledge by implementing it in practical settings and experimenting with various approaches and strategies to assess their efficacy within real-life contexts (Dantas & Cunha, 2020; Pamungkas et al., 2019). The Kolb Learning Styles exhibit a close correlation with the experiential learning paradigm. According to Kolb, individuals possess distinct learning styles that exert an influence on their approach to the process of learning. Kolb's framework delineates four distinct learning styles: Converging, Diverging, Assimilating, and Accommodator. Numerous researchers have conceptualised various learning styles, and various assessment tools have been devised to ascertain these types. Among these options, Kolb's learning model is the most extensively utilised (Alshammari & Qtaish, 2019; Biabani & Izadpanah, 2019; Engels & De Gara, 2010). This theory posits that individuals possess distinct preferences regarding their optimal learning methods. By gaining an awareness of their preferred learning style, individuals can customize their learning experiences to maximize their comprehension and retention of knowledge. The experiential learning theory supports the study, which offers a theoretical foundation for comprehending how individuals acquire knowledge through personal experiences, reflection, conceptualization, and experimentation (McCarthy, 2010). By acknowledging and adapting to various learning styles, educators, and learners have the potential to augment the efficacy of the learning process. The focus of the current study is to identify the Kolb styles of learning among students.

Conceptual Framework

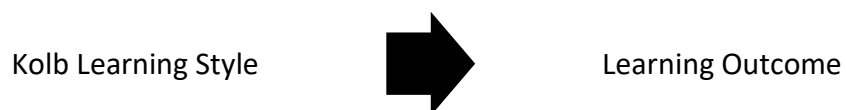


Figure 2

Conceptual Framework on Kolb's learning styles and student learning outcomes

A conceptual framework for identifying the learning styles based on Kolb and determining the influence of Kolb's learning styles on student learning outcomes was developed. This framework guides the study to explore the relationship between the four learning styles proposed by Kolb (converging, diverging, assimilating, and accommodating) and their impact on student learning outcomes (Biabani & Izadpanah, 2019; Othman & Othman, 2012; Sudria et al., 2018). Student learning outcomes encompass the cognitive, psychomotor, and affective domains of information, abilities, and attitudes that students acquire due to their educational

achievement. The results can exhibit variability contingent upon the learning style and instructional approaches. The conceptual framework investigates influence of various learning styles on students' learning outcome. In contemporary educational settings, educators must provide an environment that promotes active engagement in the acquisition of knowledge. The differences among students, in particular, have a discernible influence on the collection and organisation of information (Dimkpa, 2015; Rogowsky et al., 2020). When developing the design of an academic setting, it is crucial to consider unique characteristics. Learning styles refer to individuals' unique inclinations towards the reception and cognitive processing of information. Engineering education can be improved by considering the learner's preferred learning style (Kipper & Ruutmann, 2012; Li et al., 2019). Furthermore, it enables comprehending and acquiring complex ideas and abilities that may present difficulties when communicated through conventional pedagogical approaches. Educators can enhance the effectiveness of teaching techniques and interventions by examining the influence of Kolb's learning styles and CGPA results.

Data acquired by evaluating students' learning styles can aid educators in formulating efficacious methods for adult learning and teaching contexts. Educators who take into account the learning patterns of their pupils aim to establish educational environments that are anticipated to enhance learning efficiency (Dimkpa, 2015; Halim et al., 2021). The learning styles of students have a substantial impact on their academic achievement. Nevertheless, many students need assistance recognizing their individual learning preferences, which might impact their study habits and dampen their motivation to grasp the educational content. In order to successfully handle these conditions, both students and instructors need to possess a sufficient comprehension of learners' learning styles and preferences. Accommodating the distinct learning styles of different pupils might provide a significant obstacle owing to the inherent variety in their learning processes. Educators can adapt their teaching approaches to correspond with their pupils' cognitive inclinations (Lingua, 2021). Although students may have diverse learning styles, their academic success is paramount in the instructional process. The skill development process in students involves their ability to identify and use the most learning methods to improve their learning outcome. This study enables educators to cater to students' varied requirements, resulting in enhanced learning outcomes.

Methodology

The research sample comprises 100 engineering students from Polytechnic Sultan Idris Shah in their third semester. The implementation of the Simple Random Sampling method was carried out. The researchers utilised the sampling choice of Krejcie and Morgan (Godden, 2004) in order to determine the appropriate sample size. A cohort of 80 students enrolled in the Department of Electrical Engineering participated in completing the questionnaire. Students at the faculty's premises voluntarily completed the questionnaires. Questionnaire developed by (Melinda, 2018) was adapted and modified to gather information on learning styles. The questionnaire comprised 40 questions, requiring students to select either "Yes" or "No" as their response option. In order to assess the student's overall academic performance, they were requested to provide their Grade Point Average (GPA) from the preceding semester. The present study employs descriptive analysis to conduct data analysis, specifically by utilizing data interpretation by calculating the percentage (%) of students' learning styles. The employed approach involves quantifying the affirmative responses provided by students concerning the total number of statements encompassed within the Kolb Learning Style Inventory (KLSI) questionnaire. The study employed Linear Regression Analysis to examine

the influence of learning style on Cumulative Grade Point Average (CGPA)(Kumari & Yadav, 2018).

Findings and Discussion

A group of 40 students, which accounts for 50% of the total student population, demonstrates the Diverger style. The findings suggest that 19 students (representing 23.75%) display a preference for the assimilator learning style among the entire student population. In comparison, out of the total number of students, 12 individuals, accounting for 15% of the sample, demonstrate a preference for the accommodator learning style. Similarly, nine students, constituting 11.25% of the sample, display an inclination towards the converger learning style. Figure 2 presents a graphical representation of the Kolb learning style preferences among students.

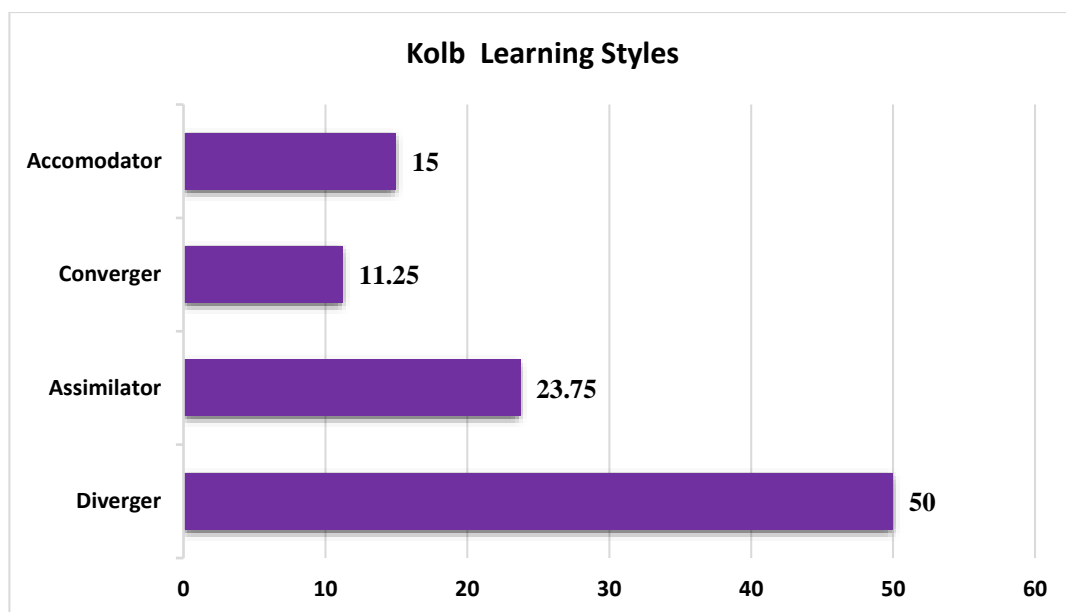


Figure 2
Kolb Learning Styles

Based on data analysis findings, the Diverger learning style is the most preferred among students, with the Assimilator type closely trailing after. Individuals with a divergent learning style possess a remarkable capacity to comprehend real-life situations from various perspectives. The findings of the study suggest that students who demonstrate a propensity for divergent thinking display a predilection for tasks that necessitate the generation of numerous ideas via brainstorming, information gathering, problem-solving, and a willingness to engage in experimentation without apprehension of failure (Hajaro et al., 2021; Idkhan & Idris, 2021). The person experiences a particular circumstance and then examines the event from several viewpoints, ultimately acquiring valuable information from each position. Furthermore, the effectiveness of this specific learning strategy is based on the use of visual aids.

One notable limitation of this learning style is its tendency to quickly lose interest and disengage when confronted with complex issues that need substantial time to grasp, address, or resolve (Idris et al., 2020; Muro & Terry, 2007). Based on the research results, students who possess the assimilator learning style have a notable advantage in their ability to absorb information from various sources. This advantage is observed in around 24% of the student

population. The data is subjected to analysis from many perspectives and afterwards synthesized in a coherent and precise manner, ensuring its accuracy. The assimilative learning style is more inclined towards abstract notions than practical applications. The results are consistent with previous academic studies that have identified the diverger learning style as the most often seen. Based on the results obtained from the investigation, the accommodator and assimilator learning styles were determined to be the second most frequently observed. However, the converger learning style was the least frequently observed. Students often select the Diverger learning style as their primary form of learning, while the Converger kind tends to be somewhat less esteemed. The results are consistent with previous research showing a more significant occurrence of divergent thinking among groups of students (Wangdi et al., 2020).

The results are consistent with previous research that identified the divergent learning style as the most common and favoured among the participants (D'Amore et al., 2012; Suliman, 2010; Vizeshfar & Torabizadeh, 2018). On the other hand, the preferred learning styles that have been reported by previous research vary from the ones that have been discovered in the current study.. In contrast to the present study's findings above, different studies indicate that the converger or assimilator learning style is often found among student populations (Melinda, 2018; Othman & Othman, 2012; Sudria et al., 2018) The findings of the study suggest that students employ many learning strategies in their pursuit of academic goals (Kharb et al., 2013; Shah et al., 2013). The academic achievement of students is assessed through their Cumulative Grade Point Average (CGPA). The study employed linear regression analysis as a method of investigation to assess the influence of students' learning styles on their cumulative grade point average (CGPA). Table 1 shows the result of linear regression analysis.

Table 1

*Linear Regression Analysis***Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.134 ^a	.018	.005	.41332

a. Predictors: (Constant), LearningStyle

b. Dependent Variable: LearningOutcome

The results reveal that the R Square value is 0.018, proving a minor impact of learning styles on learning outcomes. The results are consistent with other academic studies showing a limited influence of learning style on educational achievements (Saat et al., 2022). The findings of this study are consistent with other research, which suggests that using Kolb's learning approach has shown little effect on students' academic performance (Hidayati et al., 2021; Ramlah et al., 2014). Kolb's hypothesis posits that students' learning styles exhibit diverse features. The findings of this current study align with previous research that has shown that learning style does not significantly influence students' academic performance (Halim et al., 2021; Hidayati et al., 2021; Putri et al., 2019). The findings of this study align with previous studies that indicates a lack of correlation between students' learning styles and their achievement in education might be attributed to several variables, such as the viewpoints of educators and learners, as well as possible methodological limitations in research (Che Yusof et al., 2020; El-Sabagh, 2021; Othman & Othman, 2012; Yazici, 2016). In

order to accommodate the many characteristics of their pupils, educators must adapt their instructional methods. This necessitates a comprehensive comprehension of the learning style of every learner. It is vital for students to effectively use learning styles in order to get a comprehensive understanding of the particular learning style that is necessary. However, the findings of this study are in opposition to other studies that demonstrated a strong and statistically significant association between learning styles and students' academic performance (Hidayati et al., 2021; Putri et al., 2019).

Conclusion

This research may provide a basis for improving instructional approaches and academic performance. The enhancement of the manageability of the learning process may be achieved by introducing a fresh technique that effectively engages the students' attention. The potential for improved academic performance may be demonstrated when students enjoy learning. The university is responsible for fostering a self-directed learning methodology among its students. To optimize their academic performance, students need to acquire an understanding of their preferred learning styles. This awareness enables students to cultivate self-awareness and execute efficient learning approaches, enhancing their educational outcomes. In general, a lack of significant association exists between an individual's learning style and their learning result. One potential weakness of this study is its exclusive emphasis on the impact of learning style, specifically on students' cumulative grade point average (CGPA). The current study did not examine ethnicity, age, courses, or other quantitative data. The study's ability to accurately capture time is still being determined. The limited number of participants may have implications for the generalizability and validity of the findings, as they may only represent a subset of the electrical engineering student population at Polytechnic Sultan Idris Shah. Understanding the learning styles of students may be advantageous for educators and learners. It is crucial to determine and comprehend the preferred learning mode of learners. The examination of the relationship between them has considerable importance. Subsequent investigations are anticipated to provide significant insights into the efficacy of various statistical methodologies in ascertaining students' learning preferences. The use of an ethnographic technique has the potential to provide a more comprehensive understanding of the topic being investigated. The study's findings have noteworthy consequences for educators, particularly those creating instructional materials for educational use. Research may also be undertaken to assess the correlation between students' previous academic experiences and their preferred approach to learning styles.

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