



Kolb's Learning Styles of Learners

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Abstract. This study is compounded by the dearth of existing research in highlighting how demographic factors influence college students' learning styles to develop tailored instructional strategies, enhance educational outcomes, and promote inclusivity in higher education. It investigates the learning styles of college students at Ilocos Sur Polytechnic State College-Cervantes Campus and their association with various demographic factors. The study, conducted using the Descriptive survey method, collected data through Kolb's Learning Style Inventory. A total of 135 student respondents from diverse degree programs participated in the study. The study found significant relationships between learning styles and gender, age, mother's highest educational attainment, monthly family income, and academic progress. Female students tended to favor the Activist learning style, and older students exhibited distinct learning style preferences. Mother's educational background and family income levels significantly influenced learning style choices. In contrast, the type of degree pursued and the number of siblings did not substantially impact learning styles. Furthermore, academic progress was linked to learning styles, emphasizing the importance of tailored instructional approaches. Surprisingly, the availability of learning resources did not significantly affect learning style preferences. These findings underscore the need for educators and institutions to consider students' diverse learning style preferences when designing instructional strategies. Future research can explore additional variables that influence learning styles and expand the study's scope to more diverse student populations and educational contexts.

Keywords: College students, Demographic factors, Ilocos Sur Polytechnic State College, Learning styles, Philippines

1 Introduction

Ilocos Sur Polytechnic State College's strategic direction is to become a premier state college in the country, excelling in research and extension, with the goal of producing learners who are board toppers and achieving a 100% passing rate in the National Competency Assessment (ISPSC Quality Policy, 2019). This statement outlines the strategic direction that all stakeholders should work towards. One key milestone in achieving this vision is ensuring the quality of service provided by top managers and the instructional effectiveness and efficiency of teachers. An important consideration in successful curriculum delivery is matching the chosen teaching methodologies with the preferred behavioral learning styles of the learners.

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Behavioral learning style, technically defined as the characteristic ways individuals approach problem-solving, is consistent and reflects underlying factors imposed by biology and development. These factors can make one teaching method effective for some learners and ineffective for others (Xu, 2011). These variations in learning styles present challenges to teachers in ensuring effective learning.

Understanding learners' learning styles enables teachers to use more effective teaching methods and select appropriate educational tools, both of which are crucial for learners' success (Kozlova, 2018). Dela Cruz (2015) emphasized that successful team teaching and learning depend on the congruency of learning styles and teaching styles, a sentiment echoed by Harb and El Shaarawi (2006), who found that a good match between learners' preferences and instructors' teaching styles positively affects learners' performance.

Scholars advocating the learning preferences approach argue that effective instruction requires diagnosing learners' preferences and tailoring instruction accordingly (Pashler, McDaniel, Rohrer, & Bjork, 2008). Studies have shown that when only one instructional method is used in a class, some students may find the learning environment less optimal, leading to negative effects on academic performance (Chetty et al., 2019). Moreover, a mismatch between learning and teaching styles can result in boredom and inattentiveness, discouraging learners and potentially causing dropouts and academic incompetence (Dorgu, 2015).

In the midst of pandemic-induced restrictions on face-to-face instruction, Ilocos Sur Polytechnic State College – Cervantes Campus has adopted the use of printed modules as an alternative method for delivering education. This shift has presented unique challenges, particularly in the absence of direct interaction that hinders the ability to personally assess learners' individual learning styles. The inability to discern these styles limits the faculty's capacity to tailor teaching strategies and create customized learning materials accordingly. This learning environment, characterized by a lack of in-person connection, exacerbates existing issues within the educational system. The challenges include an escalating dropout rate and a noticeable increase in the number of learners obtaining low progress marks (IP) at the campus. The multifaceted nature of these obstacles underscores the necessity for innovative solutions. Notably, the researcher posits that a pivotal step in addressing these persistent issues lies in the identification of learners' unique learning styles. Understanding and recognizing these individual preferences can serve as a foundation for the development of targeted strategies aimed at enhancing the learning process. By leveraging insights into learners' diverse approaches to education, the institution can devise more effective methodologies, ultimately mitigating the adverse effects of the current learning conditions and fostering a more conducive post-pandemic educational environment.

Previous studies in this area have commonly used tools like Marshall & Merritt's Learning Style Inventory (LSI) or Honey & Mumford's LSI to assess learning styles (Ilcin et al., 2018). There have been no prior publications in the literature reporting ISPSC learners' learning styles using Kolb's LSI. Therefore, this study aims to investigate the learning styles of ISPSC – Cervantes Campus learners, marking a significant contribution to the local literature.

Kiblasan et al (2016) in their study titled Analyzing the learning style and study habit of learners in the faculty of nursing of Al Jabal Al Gharbi University, Gharyan, Libya using the Flemming's VAK/ VARK model generally revealed that BSN learners found to be visual learners and have the motivation as the most scaled study habit. Furthermore, differences in learning style and study habits according to demographic profiles vary. Indeed, there is a strong relationship between the learning style and study habits among BSN learners of Al Jabal Al Gharbi University, Gharyan, Libya.

Cantina and Flores (2020) in their study using the Learning Styles Inventory of Honey and Mumford have found the pattern reflector-pragmatist-activist-theorist among their respondents. The reflector learner style emerged as the dominant learning style among the respondents. There was a significant difference in the learning style of the learners between male and female respondents on the reflector learner style. The type of school they graduated from high school either private or public did not influence their learning style. Moreover, the educational qualification of the parents influences the theorist learning style of the respondents.

Behavioral learning styles are related to several factors. For example, Ilcin et. Al (2018) and Magdalena (2014) found a positive correlation of learning styles to academic performance. The data show an inconsistent result specifically on the variables. Hence, this study considered gender, and course as variables of the study to determine discrepancies, if any, among the enrollees of the College on which the outputs of the module would be based. From the studies cited, there have been several Learning Styles Inventory instruments to determine the learning styles of learners (Romanelli et al, n.d.). Some of which include the Grasha – Reichmann Student Learning Scales (GRSLSS) Flemmings VAK/VARK model; Kolbs Learning; and Honey & Mumford Learning Style Theory which this paper has adopted and anchored with..

Cognizant of all the academic literature undergirds in terms of the significance of determining behavioral learning styles, and its counter effect to the attainment of educational goals due to socio-political issues beyond man's control like the COVID-19 crisis, among others, the researchers proposed this study to establish milestones for academic-related undertakings towards improving teaching and learning endeavors.

The study aimed to determine the profiles of the learners in terms of Gender; Course of study, Age, Mother's highest educational attainment, Monthly family income, No. of siblings, Academic Performance and, Availability of learning resources; to determine the preferred learning styles of ISPSC – Cervantes Campus' learners considering their Gender; Course of study, Age, Mother's highest educational attainment, Monthly family income, No. of siblings, Academic Performance and, Availability of learning resources; and to determine if there is a significant relationship of the learners' learning styles to their profile.

In this study, the researchers employed frequency and percentage analyses to assess the distribution of learning styles among learners based on identified variables. This involved counting the occurrences of each learning style and expressing them as percentages of the total. Subsequently, the researchers utilized ANOVA Two Factor without Replication to investigate the significant relationship between learners' learning styles and the identified variables. This statistical analysis involved formulating hy-

potheses, collecting and organizing relevant data, setting a significance level, performing ANOVA calculations, and interpreting the results. The selected significance level was commonly set at 0.05, and a p-value below this threshold would lead to the rejection of the null hypothesis, indicating a significant relationship between learning styles and the identified variables.

2 Results and Discussion

Table 1. Profile of the Respondents

Profile	Category	Frequency	Percentage
Gender	Female	76	56%
Degree	BEED	33	24%
Age Range	20-21	86	64%
MHEA	HS Graduate	40	30%
MFI	Below 5,000	65	48%
No. of Siblings	4 & above	90	67%
Learning Style	Activist	78	58%
ALR	Printed Material	57	42%
AP	81-85	108	80%

Table 1 provides a profile of the student-respondents in the study. The table includes information on gender, degree, age, mother's highest educational attainment, monthly family income range, number of siblings, learning style, available learning resources, and academic performance.

In terms of gender, the majority of the student-respondents were female (56%), followed by male (41%) and LGBTQ (3%). Regarding the degree of the student-respondents, the study included various fields of degree courses. The most common degrees were BEED (24%), BSCrim (17%), and BSIT (16%), while the least common degrees were BTVTED (15%), BTLEd (12%), and BSEd (16%). These findings suggest that the student-respondents represent a diverse range of academic disciplines. Zhang et al., (2012) in their study also considered the distribution of gender as important to consider when analyzing the data and drawing conclusions in research. Additionally, their study included the diversity of degree courses.

In terms of age, the majority of the student-respondents were in the 20-21 age range (64%), followed by 18-19 (24%), 22-23 (9%), and 24-above (3%). As highlighted by Fikadie et al., (2014), this distribution of age reflects the typical age range of undergraduate students.

The table also provides information on the mother's highest educational attainment of the student-respondents. The majority of the mothers had a high school graduate (30%) or college undergraduate (28%) level of education, followed by college graduate (16%), elementary graduate (6%), post-graduate (4%), elementary undergraduate (7%), and high school undergraduate (9%). These findings suggest that the educational background of the mothers varies among the student-respondents. In terms of monthly family income range, the majority of the student-respondents came from families with a monthly income below 5,000 (48%), followed by 5,000-10,000 (33%), 11,000-20,000

(11%), 21,000-30,000 (5%), and 31,000-40,000 (2%). These findings indicate that a significant portion of the student-respondents come from families with lower income levels. The number of siblings among the student-respondents varied, with 2 to 3 siblings being the most common (31%), followed by 4 and above (67%) and only child (2%) This distribution of the number of siblings provides insight into the family dynamics of the student-respondents (Zhang et al., 2012). The table also includes information on the learning style of the student-respondents. The most common learning style was activist (58%), followed by reflector (33%), pragmatist (6%), and theorist (3%) These findings suggest that the student-respondents have different preferences and approaches to learning (Awang et al., 2017). Regarding available learning resources, the student-respondents had access to various resources. The most common resources were printed material (42%) and digital technology (39%), while others (19%) were also mentioned . These findings indicate that the student-respondents have access to a combination of traditional and digital learning resources. Lastly, the table provides information on the academic performance of the student-respondents. The majority of the student-respondents had an academic performance in the range of 81-85 (80%), followed by 75-80 (10%) and 86-90 (10%). These findings suggest that the student-respondents generally performed well academically.

Table 2. Preferred learning styles considering the profile of the students.

Profile	Learning Styles
Gender	Activist
Degree	Activist
Age Range	Activist
MHEA	Activist
MFI	Activist
No. of Siblings	Activist
AP	Activist
ALR	Activist

Table 2 presents the distribution of the preferred learning styles among students across different demographic and academic factors. When considering gender, female students exhibit a higher preference for the Activist learning style, followed closely by the Reflector style, while male students also favor the Activist style, though to a lesser extent. LGBTQ students display a more mixed distribution across learning styles, reflecting diversity within this group. The choice of degree program significantly impacts learning style preferences. For instance, the Bachelor of Science in Education (BEED) program has the highest representation of students with an Activist learning style (83%), indicating that these students tend to engage in hands-on and experiential learning. Similarly, the Bachelor of Science in Information Technology (BSIT) program also shows a considerable preference for the Activist style (71%), likely due to the practical nature of the field. Age plays a role in learning style preference, with the 20-21 age group demonstrating the highest proportion of Activist learners (64%), suggesting a trend to-

ward active and participatory learning as students progress through their academic journey. In contrast, older age groups exhibit a lower prevalence of the Activist style. The educational attainment of students' mothers influences their learning style choices. Students whose mothers are college graduates tend to favor the Activist style (56%), possibly indicating a supportive educational environment at home. High school graduates also show a substantial proportion of Activist learners, suggesting that parental education levels can impact a student's learning style. Family income levels are associated with learning style preferences. Students from families with lower monthly incomes, below 5,000, are more likely to prefer the Activist learning style (54%). As family income increases, there is a gradual decline in the proportion of Activist learners, indicating that financial resources may influence a student's access to certain learning experiences. The number of siblings a student has can affect their learning style choice. Those with four or more siblings exhibit a significant preference for the Activist learning style (55%), possibly due to a more dynamic and interactive home environment. Similarly, students with 2 to 3 siblings also show a substantial proportion of Activist learners (27%). Academic performance, as measured by the Academic Performance percentage, is linked to learning style preferences. Students in the 81-85 AP range show the highest prevalence of the Activist style (52%), suggesting that those achieving moderately high grades tend to engage in active and practical learning methods. Pragmatist learning style is also favored by this group.

These research findings emphasize the dynamic relationship between demographic and academic factors and students' preferred learning styles. Educators and institutions can use these insights to tailor their teaching methods and materials to better suit the diverse learning preferences of their students, ultimately enhancing the effectiveness of the learning experience.

Table 3. Relationship of respondents' profile and learning styles.

LEARNING STYLES					
	Reflector	Pragmatist	Activist	Theorist	
Gender					
			F-VALUE	P-VALUE	
Gender			7.85423	0.02111	SIG
Degree			1.12718	0.38805	NS
Age Range			5.12749	0.02435	SIG
MHEA			4.75099	0.004566	SIG
Monthly Family Income			4.35999	0.01192	SIG
No. of Siblings			4.52742	0.06330	NS
Academic Performance %			5.87444	0.00742	SIG
ALR			1.98962	0.21735	NS

Table 3 presents the relationships between various demographic factors and learning styles among the participants. The p-values associated with each factor were used to determine their significance in relation to learning styles.

Gender yielded a p-value of 0.0211, indicating its significance in influencing learning styles. This suggests that there may be gender-related differences in how individuals

approach and prefer learning. The findings are in contrast with a study conducted on students in a primary school setting that had found no effect of gender on the learning styles of students (Astuti et al., 2020). Similarly, another study on undergraduate physiology students found no significant gender difference in learning style preferences (Wehrwein et al., 2007). These findings suggest that the relationship between gender and learning styles may not be consistent across different populations and contexts. On the other hand, several studies have reported significant gender differences in learning style preferences. A study conducted among undergraduate medical students in South India found a statistically significant difference in the learning style preferences of male and female students (Raj & Kanagasabapathy, 2019). Another study on undergraduate medical students using the VARK questionnaire also found a significant influence of sex on learning styles (Kamath et al., 2014). These findings suggest that gender may play a role in shaping learning style preferences, particularly in certain academic disciplines and while gender may have some influence on learning styles, it is not the sole determinant.

Age also emerged as a significant factor, with a p-value of 0.0244. This finding implies that age may play a role in shaping learning styles, with different age groups exhibiting distinct preferences in their approach to learning. Studies have reported significant associations between age and learning style preferences. A study conducted on ESL students found that age was a significant factor in determining learning style preferences, with older students showing a preference for a more diversified range of learning styles (Reid, 1987). Another study on design students found that age was significantly related to learning styles, with older students exhibiting different learning style preferences compared to younger students (Demirbaş & Demirkan, 2007). These findings including the finding at hand suggest that age may indeed play a role in shaping learning style preferences, with different age groups exhibiting distinct preferences in their approach to learning. However, Nuzhat, et.al (2013) found no significant difference in learning styles based on age. Similarly, a study on first-year medical students in Iran also found no significant relationship between learning style preferences and age (Asiabar et al., 2014). These findings suggest that age may not play a significant role in shaping learning styles (Nuzhat et al., 2013; Asiabar et al., 2014).

Furthermore, Mother's Highest Educational Attainment (MHEA) and Monthly Family Income (MFI) both demonstrated significance, with p-values of 0.0046 and 0.0119, respectively. These results imply that a mother's educational background and a family's income level may have an impact on the learning styles of the participants. This finding is in contrast with Nuzhat et al. (2011) and Elkalmi et. Al (2015) who found no significant association between learning style preferences and family income suggesting that mother's educational attainment and family income may not have a significant impact on learning styles. However, other studies have reported significant associations between mother's educational attainment, family income, and learning styles. A study conducted on Hispanic higher education students found that older students and students from families with higher levels of education had a greater preference for visual learning (Lui et al., 2018). Another study on Turkish physiotherapy students found that academic performance was positively correlated with participant learning style and neg-

atively correlated with avoidant learning style (Ilçin et al., 2018). These findings suggest that mother's educational attainment and family income may indeed have an impact on learning style preferences (Lui et al., 2018; Ilçin et al., 2018).

On the other hand, Degree and the Number of Siblings were found to be not significant factors (p-values of 0.3880 and 0.0633, respectively) in relation to learning styles. This suggests that the type of degree pursued and the number of siblings a participant has may not have a substantial influence on their learning style preferences. One study conducted on medical undergraduates and postgraduates found no significant relationship between learning styles and the degree pursued (Samarakoon et al., 2013; . Similarly, a study on nursing students found no significant association between learning styles and gender, which indirectly suggests that the type of degree pursued may not have a substantial influence on learning style preferences (Nasiri et al., 2016). These findings suggest that the degree pursued may not play a significant role in shaping learning styles. Regarding the number of siblings, research on sibling relationships has primarily focused on topics such as sibling bullying, sibling conflict, and sibling influence on various aspects of development. However, there is limited research specifically examining the relationship between the number of siblings and learning styles. One study on sibling bullying found that parenting quality and behavior were the most strongly related factors to bullying between siblings, but it did not directly examine the impact of the number of siblings on learning styles (Wolke et al., 2015). Another study on sibling aggression found that experiences of aggression towards a sibling in childhood may contribute to high-order processes in adulthood, such as decision-making, but it did not specifically investigate learning styles (Bedwell et al., 2023). This means that learning styles can be influenced by various factors, including individual preferences, cognitive abilities, and environmental factors. While the type of degree pursued and the number of siblings may not have a substantial influence on learning style preferences, other factors such as teaching methods, educational environment, and personal characteristics may play a more significant role.

Additionally, Academic Progress (AP) exhibited significance, with a p-value of 0.0074. This finding suggests that the academic progress of participants may be linked to their learning styles, indicating that learners with different progress levels may benefit from tailored instructional approaches.

This finding supports studies that have found significant associations between learning styles and academic achievement like a study on medical students which found a significant relationship between learning style preferences and academic achievement (Almigbal, 2015). However, this study did not specifically examine the impact of academic progress on learning styles. Another study on teaching styles and academic performance found that learning styles and teaching styles determine students' academic performances (Chetty et al., 2019). While this study did not specifically investigate the impact of academic progress on learning styles, it suggests that teaching styles may play a role in academic performance.

Finally, Availability of Learning Resources (AVL) was not deemed a significant factor, with a p-value of 0.2174. This implies that the availability of resources for learning may not be a primary driver in shaping the learning styles of participants. This

finding is sustaining the studies of Almigbal (2015) and Bareither et.al (2012) that suggest that students may adapt their learning approaches based on the instructor's cognitive style and that students' preferences learning style preferences can improve their academic performance rather than the availability of resources.

3 Conclusion

Gender, age, mother's highest educational attainment, and monthly family income significantly influence learning style preferences among the student respondents. Gender differences in learning styles are apparent, with female students favoring the Activist style, while age-related differences suggest that older students exhibit distinct learning style preferences. Mother's educational background and family income levels also play a significant role in shaping learning style choices. On the other hand, the type of degree pursued and the number of siblings do not seem to have a substantial impact on learning styles, indicating that other factors may be more influential. Additionally, academic progress is linked to learning styles, implying the need for tailored instructional approaches to cater to students at different progress levels. However, the availability of learning resources does not significantly affect learning style preferences, suggesting that students may adapt their learning approaches based on other factors, such as teaching styles and personal preferences.

4 Recommendation

It is recommended that educators and institutions consider the diversity in learning style preferences among students and tailor their teaching methods and materials accordingly. Future research could delve deeper into the complex interplay between these demographic and academic factors, potentially exploring additional variables that may influence learning styles, such as teaching styles and personal learning preferences. Additionally, studies with larger and more diverse samples may provide further insights into the nuances of these relationships in various educational contexts.

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