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DEMOGRAPHIC FACTORS AND LEARNING STYLE PREFERENCES OF STUDENTS IN BLENDED INSTRUCTION

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ABSTRACT

Background: Teaching is triadic in nature, comprising the teacher, the subject matter and the learner. The learners often have full control of how they learn otherwise known as learning style. Learning style, therefore, is the way students construct their learning in order to suit their type of person. It is how they can be able to have a firm grasp of a subject matter and many factors are involved.
Objective: To determine the learning style preferences of students in a blended learning environment
Methods: Three Research questions were raised to guide the study and three null hypotheses were tested at a 0.05 level of significance. A total of 144 undergraduates from two faculties (Natural Science and Management Sciences) were sampled from a private University operating a blended learning environment. The Grasha-Reichmann Student Learning Style Scales Inventory was adopted and administered to these undergraduates. The data obtained were analysed using SPSS version 25.
Results: The result obtained showed that a total of 55.6% of the respondents are males while 44.4% are females. Using the Grasha Reichmann Student Learning Style Scales Inventory, the learning preference with the highest sub scale mean score was collaborative with a mean value of 3.03±0.44 and the least mean learning preference was the avoidant (2.53± 0.48). 38.9% of the students combined more than one learning style. There was no significant difference in the learning style preference between male and female undergraduates ($\chi^2(7) = 10.26$; $\rho = 0.17$) and between students (respondents) in Management and Natural Science $\chi^2(7) = 9.01$; $\rho = 0.25$). Also, there was no significant difference in the learning style preference based on their age groups $\chi^2(14) = 9.01$; $\rho = 0.54$).
Conclusion: Based on the findings of this study, it was concluded that if every study sampled is unimodal in their learning pattern, then the most preferred learning style among undergraduates in a blended learning environment is the Collaborative learning style, while for students that are multimodal in learning, their most preferred learning styles are a combination of collaborative learning style with avoidant style.

Keywords: Learning styles, Blended learning, Demographic factors, Learning environments

1. INTRODUCTION

Over the years, education has taken a lot of turns in ensuring the effectiveness of its various instructional settings. It is therefore absurd that despite several measures taken to promote the teaching and learning processes, there are still pitfalls or rather what is termed poor academic achievement in recent times. Teaching of course is triadic in nature because it comprises the teacher, the subject matter and the learner. Sometimes more emphasis is placed on the teacher improving on the method of teaching and also having effective mastery of the subject matter when the focal point should be on the learner who is to learn something that will make him/her useful to himself or herself and to the society at large.

Fatokun and Adeniji, (2015) asserted that there is no right or wrong learning style and it is not a function of one's intelligence. Learning style

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the way students construct their learning in order to suit their type of person. It is how they can be able to have a firm grasp of a subject matter. Muthu and Nivedha (2020) stated that learning style determines how students process and recall new information and skills. The learning styles are often related to students' learning performances. Gracha-Reichmann postulated a theory on learning style, six styles were developed in their study, these include; participant, avoidant, competitive, collaborative, dependent and independent learning styles. These learning styles are briefly discussed as follows;

Independent learning style: students with the independent learning style are always confident working alone, they believe in their ability to think for themselves and thus always work on projects on their own. The teachers are to harness such learning styles in the learner to bring about the best in them.

Competitive learning style: students whose style of learning is competitive, always want to win or be correct. They are aggressive in their attempt to earn high scores in assignment. To bring out the best of these types of students, it is expected that teachers give such students leadership positions in the classroom. This is because this type of student excels in learning when there is an opportunity for reward; also contests and games in the classroom elicit better performance.

Collaborative learning style: Collaborative students perform better when working in a group. They learn best when given an opportunity to share ideas with others. They respond better in a small group than in a larger group. Tutors can help such students with their classworks or assignments by giving them group assignments.

Avoidant learning style: Avoidant students like skipping classes and never participate with teachers and other students when present. These students learn better with a relaxed and unenthusiastic teacher. They perform better without class activities and tests. They excel in a self-guided online class where interaction with instructors and students are minimal.

Participant learning style: Participants' students are described as perfect students. They are always in class and eager to learn. This group of students thrive in class discussions and love activities. They are highly motivated to learn and need organized enthusiastic teachers to reach their maximum potential.

Dependent learning style: Dependent students depend on teachers and peers as a source and guidance and prefer authority figures to tell them what to do. They show little intellectual curiosity. They view peers and teachers as authority figures to tell them what to do. They show little intellectual curiosity. They view peers and teachers as authority figure for guidance on what to do and how to do it. Teachers are expected to make themselves available for such

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students and also can pair them with their peers during class activities or assignments. Several studies have been conducted on the learning styles of students. In a study carried out by Akhentoolove (2017) using the Grasha-Riechman learning style instrument, it was found that collaborative learning was the most preferred learning style based on the mean scores of Grasha Riechman rating norms. Muthu and Nivedha (2020), findings revealed that the most common learning style among students at five different schools was the dependent learning style. Durukan, Kizkapan,and Bektas (2021) found that the sampled students adopted collaborative and competitive learning styles at a high level and employed independent, dependent, avoidant, and participatory learning styles at a moderate level. Though the dominant learning style of most students is dependent learning style, in terms of demographic variables, students' learning style preferences differ in terms of gender. Gender differences in learning styles have also been established. Akhentoolove (2017) found significant gender differences in dependent, participation, independent, and competitive learning styles. The findings of Ali, Menaz, and Hasan (2014) indicated that female students obtained significantly higher means scores in collaborative, participatory, and dependent styles than males, but in avoidant, and independent styles, the means for males were higher than those for females. Also, from the study conducted by Azarkhordad and Mehdinezhad (2016), when the learning styles of the respondents were compared based on gender, it was found that a significant difference existed between the males and females in the independent and avoidance learning style categories. The dominant styles of students based on gender were, competitive and dependent for males, and competitive, cooperative, and dependent styles for female students. Furthermore, it was found that in terms of demographic variables, students' learning style preferences differ in terms of gender based on Durukan, Kizkapan, and Bektas, (2021). Also, Vizeshfar & Torabizadeh (2017) found that the dominant styles of male and female students are cooperative, dependent

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and partnership styles. Based on gender, the results revealed that there is a significant difference in the independent and avoidance style Dominant styles of students based on gender were: cooperative, competitive and dependent for male and competitive, cooperative and dependent style for female students, but Ngala (2018) study revealed that gender was not significantly related to the ways Post-graduate students at Africa International University preferred to learn.

The way students learn may differ from one discipline or the other. For instance, the students that are science inclined may be more involved in participatory and collaborative learning styles because of their involvement in laboratory activities while students from humanities and social sciences may prefer dependent or competitive learning styles. Ali et al (2014) in their findings indicated that the mean score of their respondents from the science group in collaborative, participative, dependent, and competitive styles was significantly higher than those for the humanities group. Students' scores from the social sciences were correlated significantly with the collaborative style group, but not significantly correlated with other learning style groups. Also, the Kruskal Wallis test shows significant differences between the collaborative group and their scores in social science subjects. Despite being dependent learners, only students with collaborative learning styles were associated with significantly higher scores in social sciences subjects. Encouraging students to learn collaboratively may be effective in elevating academic performance (Muthu and Nivedha, 2020). There were significant age differences among students based on their learning styles. It was also found that the learning styles were significant predictors of students' academic performance. According to Akhentoolove (2017), students with more predominant Independent learning styles were reported to have higher Grade Point Averages (GPAs), whereas students with more predominant Avoidant learning styles reported lower GPAs.

Another important factor that could influence learners' achievement is the learning environment. The learning environment according to Prameswari and Budiyanto (2017) means an environment where students are physically, mentally, socially, and emotionally safe and satisfied by utilizing opportunities to learn through many different methods. A learning environment where students are made to take online courses, as well as face-to-face classes, is known as a blended learning environment. In such an environment, the learning styles of students also differ. This study therefore seeks to explore the learning styles of students based on Grasha-Riechman's learning style in a blended learning environment. Therefore, this study seeks to determine the learning preferences of students in a blended learning environment.

The specific objectives are to;

1. identity the learning styles of students in a private university employing a blended learning environment
2. determine if gender influences the learning

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preference of students

3. determine the differences in the learning preference of students based on their age and faculties

Research questions

What are the learning preferences of students in a studied Private University?

Does the learning preference of male and female students differ?

Do students' learning preferences differ across their age groups?

Hypotheses

Ho_1: There is no significant difference in the learning styles of male and female students

Ho_2: There is no significant difference in the learning styles of students in the Management Sciences and those in the Natural Sciences

Ho_3: There is no significant difference in learning styles of students based on their age range

2. Methods

This study employed the descriptive research design. 144 university students were randomly selected from two faculties of a private university offering programmes in a blended environment in Nigeria. The Grasha-Reichmann's Student Learning Style Scales Inventory (GRSLSSI) was adopted and administered to the undergraduates within a period of two weeks

Ritchie (2006) stated that Tony Grasha and Sheryl Hruska-Reichmann developed this inventory to identify and categorize student learning preferences as no student has any one style that they use in every situation. The Grasha-Reichmann's Student inventory has 60 items with 6 subscales (10 items in a subscale each). To identify the learning preference of a students, the scores on each item under the six subscales were summed and divided by 10 to give the mean value for each, the learning dimension where a student scores the highest is said to be the student's preferred learning style. The data obtained during the study were collated and analysed using SPSS version 25. Frequency, Percentages and Chi-square tests were used to answer the research questions.

3. Result

Using descriptive statistics to answer the research questions, the demographic representation of the students was first presented and thereafter the research questions were answered.

Table 1: Demographic Variables of Respondents

Variables		Frequency	Percentages (%)
Gender	Male	80	55.6
	Female	64	44.4
Faculty	Management Sciences	37	25.7
	Science	107	74.3
Age	Less than 20 years	84	58.3
	20- 24 years	57	39.6
	Above 24 years	3	2.1

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Table 1 shows that a total of 55.6% of the respondents are male while 44.4% are female. While 25.7% were studying courses in the faculty of management and social sciences, 74.3% were in the faculty of science. The majority of the students sampled (58.3%) were less than twenty years of age, 39.6% of them were between 20 and 24 years old and only 2.1% sampled were above 24 years.

To determine the learning preferences of the students sampled, the mean and standard deviation for each learning dimension was obtained. The result is presented in Table 2

Table 2: Grasha Reichmann Student Learning Style Scales subscale scores for undergraduates in a private University

Learning style	Mean	Std. Deviation
Independent	2.7882	.42070
Avoidant	2.5347	.48909
Collaborative	3.0285	.44086
Dependent	2.9250	.43460
Competitive	2.5278	.52603
Participant	2.9514	.45588

N = 144

The Grasha Reichmann's Student Learning Style Scales had six subscales; these are independent, avoidant, collaborative, dependent, competitive and participant. The result presented in Table 2 shows that the highest subscale score is collaborative with a mean of 3.03 and a standard deviation of 0.44. Next to collaborative learning preference is the dependent (2.92 ± 0.43) the least mean learning preference is the avoidant (2.53 ± 0.48).

3.1. Frequency of students in the Grasha Reichmann learning styles

The students were group into different learning styles, based on Grasha Reichmann's Student Learning Style Scales Inventory for undergraduates, this grouping is based on the mean score obtained by the students. The result is presented in Table 3.

Table 3: Percentage of students in each learning style

Styles	Frequency	Percentage (%)
None	4	2.8
Independent	11	7.6
Avoidant	21	14.6
Collaborative	14	9.7
Dependent	10	6.9
Competitive	17	11.8
Participant	11	7.6
Combination of two or more styles	56	38.9
Total	144	100.0

Table 3 shows that 7.6% of students learn independently, that is, they preferred to learn the content that they feel is important and prefer to work alone on course projects rather than with other students. 14.6% were not enthusiastic about learning content and attending class. This group of students do not participate with other students and teachers in the classroom and they were not interested or overwhelmed by what goes on in the class. 9.7% of students belong to the collaborative group, the people in the collaborative group believe that they can learn by sharing ideas and talents, they cooperate with teachers and like to work with others. 6.9% are the set of students who learn only what is required and view their

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and peers as sources of structure and support and look to authority figures for specific guidelines on what to do (Dependent). 11.8% of the students adopt the competitive learning style. This group of students according to Ritchie (2006) learn to perform better than others in class. They believe that they must compete with other students in their class for recognition. 7.6% of students adopted the participant learning styles. These students are those that enjoy going to class and partake in classroom activities. Table 3 also shows that 38.9% of the students combined more than one learning style, some of them combined two, others three or more learning styles. Table 3 shows the percentage of students that combined two or more learning styles.

Table 4: Percentage of students with combined learning styles

Mode of combination	Frequency	Percentage (%)
Combination of two learning styles	36	64.3
Combination of three learning styles	11	19.6
Combination of four learning styles	6	10.7
Combining all	3	5.4
Total	56	100

Table 4 shows that 64.3% of students combined two different learning styles as their learning preference, while only 5.4% claimed to combine all the learning styles. While 19.6% combined three learning styles, 10.7% combined as many as four learning styles.

Hypothesis One

There is no significant difference in learning style between male and female respondents

Table 5: Frequency and Chi-Square test of the difference in learning styles between Male and Female Students.

Gen-der	Non e	Inde-pende nt	Avoi dant	Collab-orative	De-pend ent	Competi-tive	Partici-pant	Combi-nation of two or more styles	x^2 Value	Df	P
Male	1	9	11	9	5	10	9	26	10.26	7	0.17
Fe-male	3	2	10	5	5	7	2	30			

*Significance $p < 0.05$

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Table 5 shows that there was no significant difference in the learning style preference between male and female undergraduates ($\chi^2(7) = 10.26$; $\rho = 0.17$). Although no significant difference existed, the result shows that 20.80% of the female undergraduates combined learning styles compared to 18.10% of the male undergraduates. The result also showed that a male and 3 female students seem not to have any learning preference as their scores for all the learning dimensions were very low. Figure 1 shows that aside from the students that combined two or more learning styles, the majority of the male students (7.60%) prefer the avoidant learning style. Also, a similar trend was observed for their female counterparts. But the least preferred learning style for the male students is the independent learning style (2.10%) and the least preferred learning style for the female students is the participant learning style (1.40%) .

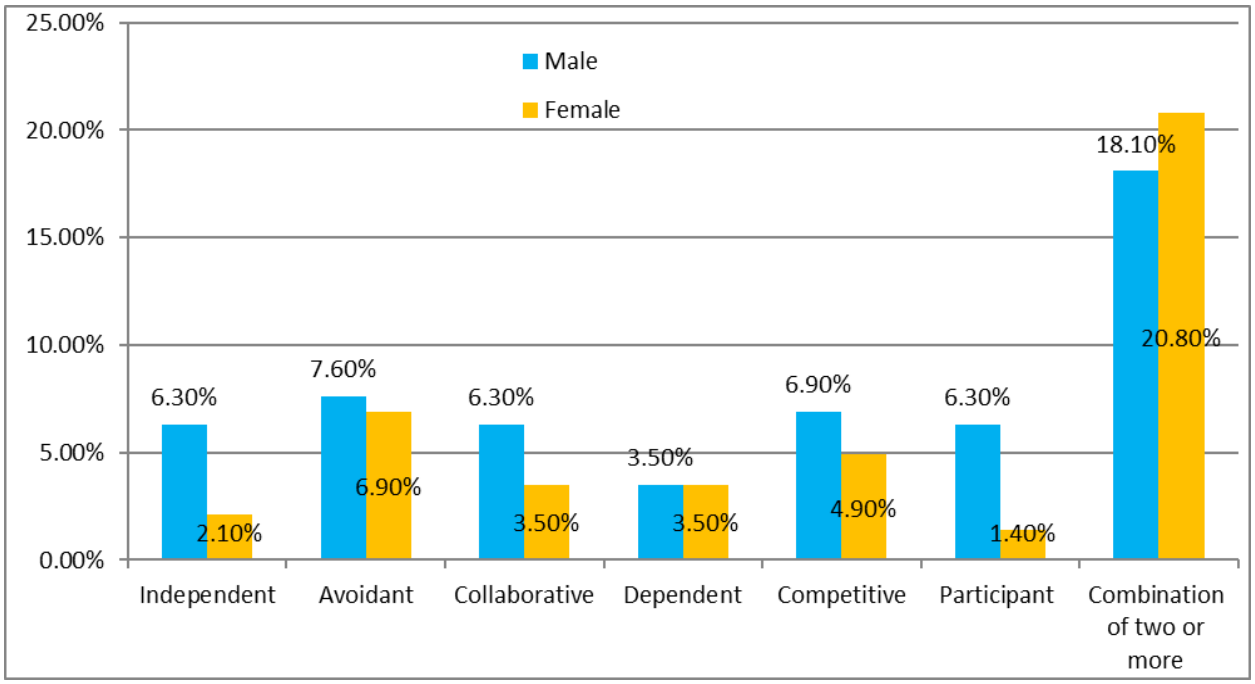

Figure 1: Learning Preference of Male and Female Students

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Hypothesis Two

There is no significant difference in learning style between students in management and Natural Sciences respondents

Table 6: Frequency and Chi Square test of the difference in learning styles based on students' faculty

Faculty	None	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant	Combination of two or more styles	χ^2 value	df	P
Management Sciences	2	3	5	4	1	3	0	19	9.01	7	0.25
Natural Sciences	2	8	16	10	9	14	11	37			

Table 6 shows that there was no significant difference in the learning style preference of students in Management and Natural Sciences students ($\chi^2(7) = 9.01$; $\rho = 0.25$).

Hypothesis Three

There is no significant difference in learning style of students based on their age

Table 7: Frequency and Chi Square test of the difference in students' learning styles based on their age

Age	None	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant	Combination of two or more styles	χ^2 Value	df	P
Less than 20 yrs	2	9	10	7	6	11	8	31	12.82	14	0.54
20- 24 years	2	2	10	6	4	6s	2	25			
25year and above	0	0	1	1	0	0	1	0			

Table 7 shows that there was no significant difference in the learning style preference of students based on their age ($\chi^2(14) = 9.01$; $\rho = 0.54$).

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Discussions

The result obtained revealed that irrespective of the learning style the sampled students adopted in learning, the collaborative learning sub-scale had the highest mean score indicating that it is the preferred learning if all students were to be unimodal in their learning pattern. This finding is in accordance with the result obtained by Nursen et al (2018) who found that collaborative learning had the highest mean value indicating that it was the preferred learning pattern by the students surveyed in Turkey. The findings of Akhentoolove (2017) suggested that Collaborative learning was the most preferred learning style based on the mean scores of Grasha-Riechman's rating norms which is similar to the findings of this study.

Also, this study revealed that quite a number of students were avoidant in their learning style. Based on the description of Grasha-Reichmann's Student Learning Style Scales Inventory, students with this learning style are not enthusiastic about learning content and attending class. They were uninterested in what goes on in class and the implication of this as found by Akhentoolove (2017) is that such students are likely to have low academic achievement. The result obtained from this study also revealed that the majority of the students combined two or more learning styles, some even combined four learning styles which suggest that they were multimodal in their learning style. The study further revealed that most students combined collaborative learning styles with other learning styles. This result is in accordance with the observation of Roell (2020), which stated that although most students favour a particular learning style, there are still many whose preference for learning is a blend of two or more learning styles. May (2018) also supports the fact that most students possess multiple learning styles. Studies that support these findings are that of Soundariya, Deepika , and Kalaiselvan (2017), who reported in their study of learning styles and learning approaches among medical students involving 121 students, that 53.8% of the students were unimodal learners and 46.2% were multimodal learners. Mohammadi et al (2015) also found in their study that 8.16% of students preferred a multi-modal learning style and among the multi-modal group, 25% (5 students) of students preferred a bimodal and 75% (15 students) preferred a quad-modal learning style.

The first hypothesis testing revealed that there was no significant difference in the learning style preference of male and female undergraduates ($\chi^2(7) = 10.26$; $\rho = 0.17$). This is consonant with Soundariya, Deepika, and Kalaiselvan (2017) assertion that there was no significant influence of gender on the learning style preferences among medical students but the finding of Akhentoolove (2017) is contradictory as it indicated significant gender differences on dependent, participant, independent, and competitive learning styles. Mohammadi, Mobarhan and Mohammadi (2015) also found a significant association between learning styles with gender ($P<0.05$).

This study revealed from the third hypothesis testing that there was no significant difference in the learning style preference of students based on their ages. This finding is not consistent with

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with Mohammadi, Mobarhan and Mohammadi (2015) report which revealed that a significant association existed between learning styles and learners' ages, Akhentoolove (2017) also affirmed that there were significant age differences for participants, collaborative, independent, avoidant and competitive learners. The two reports were at variance with the current study because age might not be a significant determinant in one's choice of learning style. There is a possibility of developing and sustaining a particular learning style consistently for a very long period or for one's lifetime.

Conclusion

The demographic factors and learning style preferences of students in a blended learning environment have been studied. The students sampled for this study indicated their learning style preferences. The Collaborative learning subscale had the highest mean score indicating that it is the preferred learning (if all students were to be unimodal in their learning pattern). For students that are multi-modal in their learning style, most of them combined collaborative learning style with avoidant style. Grasha-Reichmann's learning styles model assumes that if individual learning styles are recognized, educational environments can be designed around them to enhance learning in students. It is therefore important that teachers should be conversant with the way their students learn and tailor their teaching methods to meet their needs to ensure improved academic achievement among students. Also, the learning styles of undergraduates studied do not differ based on gender and age. Therefore, based on the findings of this study, it is recommended that faculties should adopt teaching strategies that are targeted towards the predominant learning styles of undergraduates so as to facilitate learning in the universities.

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