International Journal of Arts and Social Science www.ijassjournal.com
ISSN: 2581-7922,
Volume 4 Issue 3, May-June 2021

Cognitive Ability, Learning Styles and Academic Performance Of the Freshmen Students

Claudeth U. Gamiao, Ph.D.
[1] *Guidance and Counseling Center/ St. Paul University Philippines, Philippines*

ABSTRACT: *This research was conceptualized to investigate whether cognitive ability, learning style and academic performance relates with each other. The study made used of the descriptive-quantitative research design. The participants of the study were the first-year college students who are currently enrolled in the programs of the School of Information Technology and Engineering of St. Paul University Philippines. The Otis-Lennon School Ability (OLSAT) Test 8th ed. which was developed by Arthur Sinton Otis and Roger Thomas Lennon in 2003 was used to measure the cognitive ability of the participants. The Learning Styles Inventory (LSI) that was developed by Albert A. Canfield and published in 1988 was used to identify the learning styles of the participants. The grade point average of the participants during the first semester of Academic Year 2019 – 2020 was used for the academic performance. The statistical treatments that were used to analyze the data gathered include Frequency and Percentage distribution and the Chi-square test. Results revealed that course can contribute to the variation in the learning style of the participants. Also, course, sex, and age are viable factors that contribute to the significant difference in students' academic performance. However, participants' Cognitive Ability and Learning Styles are not predictive of Academic Performance, as well as Cognitive Ability and Learning Styles are not significantly related with each other.*

KeyWords: *Cognitive Ability, Learning Styles, Academic Performance*

I. INTRODUCTION

St. Paul University Philippines, a premiere university in Region 02, is an internationally recognize private university. Catering to a multicultural students coming from the different provinces of the Philippines, as well as students coming from other countries, it strives to ensure a high quality education to its learners to equip them with the necessary knowledge and skills needed in the field of work.

Ensuring further that student can learn to the best of their ability, activities or programs are planned and conducted to assist students learn to their fullest. The Guidance and Counseling Center of the university is one with the institution in attaining this particular goal. Psychological tests are given to students to gain data on their cognitive abilities, learning styles, and personality traits. Data gathered from these tests could give insights on how to further help the students develop their full potential, thus, the conduct of this research. This present research aims to give information on how cognitive ability, learning style and academic performance relates with each other.

II. CONCEPTUAL FRAMEWORK

This study was focused to investigate on three key concepts, namely, Cognitive Ability, Learning Styles, and Academic Performance.

One set of factors that is important for academic performance consists of cognitive abilities (Peng, P. & Kievit, R., 2020). Cognitive abilities as defined by Flavell 1999 cited by Huang, G., Xie, Y., and Xu, H. (2015) is an aptitude for carrying out mental processes, such as problem solving, adaptation, comprehension, reasoning, knowledge acquisition, abstract thought, and making connections. These are brain-based skills we need to carry out any task from the simplest to the most complex (Michelon, P., 2006). As cited by Peng, P. and Kievit, R., 2020, academic performance is a result of the investment of cognitive abilities and the environmental stimulation offered by, for example, educational settings, and cognitive abilities are assumed to be the basis for the development of academic performance (Cattell, 1987).

İlçin, N., Tomruk, M., Yeşilyaprak, S.S., Karadibak, D., & Savcı, S. (2018) on the other hand, mentioned in their research that learning style preferences are influential in learning and academic achievement, and may explain how students learn (Yazici HJ, 2016). Hawksworth, S. (2015) defines learning style as an

individual's approach to learning based on strengths, weaknesses, and preferences. A student can absorb knowledge faster if he is aware of his learning style and uses it. Moreover, when teachers know the learning styles of the students, he or she can adjust his or her teaching strategies to enhance the assimilation of information by the students.

III. STATEMENT OF THE PROBLEM

This research aimed to investigate the relationship among cognitive ability, learning styles and academic performance of the School of Information Technology and Engineering freshmen of St. Paul University Philippines.

Specifically, it sought to answer the following problems:

1. What is the profile of the participants when grouped according to:
   1.1. course;
   1.2. sex;
   1.3. age;
   1.4. type of high school origin; and
   1.5. senior high school track/strand?
2. What is the cognitive ability of the participants when grouped according to profile variables?
3. What is the learning style of the participants when grouped according to profile variables?
4. What is the academic performance of the participants when grouped according to profile variables?
5. Is there a significant difference in the cognitive ability of the participants when grouped according to profile variables?
6. Is there a significant difference in the learning style of the participants when grouped according to profile variables?
7. Is there a significant difference in the academic performance of the participants when grouped according to profile variables?
8. Is there a significant relationship among cognitive ability, learning styles and academic performance?

IV. METHODOLOGY

The study made used of the descriptive-quantitative research design. An archival-correlational technique was utilized to examine the relationships among the variables included in the study since the data that were used have been gathered for some other purpose.

The participants of the study were the first year college students who were enrolled in the School of Information Technology and Engineering of St. Paul University Philippines with the courses of Bachelor of Science in Information Technology (BSIT), Bachelor of Science in Civil Engineering, and Bachelor of Science in Computer Engineering during the first semester of Academic Year 2019 – 2020.

For the completion of the study, the following instruments were used:

The result of the Otis-Lennon School Ability (OLSAT) Test that was administered by the guidance counselor was used to measure the cognitive ability of the participants. The OLSAT, 8th ed. which was developed by Arthur Sinton Otis and Roger Thomas Lennon in 2003 is intended to quantify cognitive abilities associated to performance in school, measuring critical thinking and reasoning skills. Memory, speed of thought and ability to see relationships and patterns are also tested by the test (testprep-online, nd.)

The Learning Styles Inventory (LSI) administered also by the guidance counselor was used to identify the learning styles of the participants. The LSI was developed by Albert A. Canfield and published in 1988. It is a self-report questionnaire that allows students to describe what features of their educational experiences they most prefer. There are 9 distinctive categories to which the learning styles of the students are classified. These include Social, Independent, Applied, Conceptual, Social/Applied, Social/Conceptual, Independent/Applied, Independent/Conceptual, and Neutral Preference (Canfield, A. 1988).

The grade point average of the participants during the first semester of Academic Year 2019 – 2020 was used for the academic performance. It was gathered from the Office of the Registrar of St. Paul University Philippines.

The profile variables (course, sex, high school graduated from, and track/strand), on the other hand, were gathered from the Cumulative Forms of the participants kept in the Guidance and Counseling Center.

The following statistical treatments were used to analyze the data gathered: Frequency and Percentage distribution were used to present the profile variables, the cognitive ability, learning style and academic

performance of the participants. The Chi-square was used to present the significant difference in the cognitive ability, learning style and academic performance of the participants when they are grouped by profile variables, as well as to present the significant relationships among the three variables included in the study.

Also, the scale below was used to present the academic performance of the participants.

Table 1.

Grade Point Average	Descriptive Interpretation
93.00 and above	Excellent
87.00 – 92.99	Very Good
81.00 – 86.99	Good
75.00 – 80.99	Fair
Below 75.00	Poor

V. RESULTS AND DISCUSSION

1. Participants' Profile

Table 2. Participants' Profile According to Course, Sex, Age, Type of High School Origin, and Senior High School Track/Strand

Profile		Frequency	Percentage
Course	BSCE	16	34.00
	BSCOE	11	23.40
	BSIT	20	42.60
	Total	**47**	**100.00**
Sex	Male	30	63.80
	Female	17	36.20
	Total	**47**	**100.00**
Age	17	5	10.60
	18	30	63.80
	19	11	23.40
	20	1	2.10
	Total	**47**	**100.00**
Type of High School Origin	Public	8	17.00
	Private	39	83.00
	Total	**47**	**100.00**
SHS Track/Strand	ABM	9	19.10
	HUMSS	4	8.50
	STEM	24	51.10
	GAS	6	12.80
	TVL	4	8.50
	Total	**47**	**100.00**

Table 2 shows Participants' Profile According to Course, Sex, Age, Type of High School Origin, and Senior High School Track/Strand. The biggest number of the participants (20 or 42.60%) are taking up Bachelor of Science in Information and Technology (BSIT), while the Bachelor of Science in Civil Engineering (BSCE) participants comprised of 16 or 34.00%. The least number of participants are taking up Bachelor of Science in Computer Engineering (BSCOE) with a frequency of 11 or 23.40%

Majority (30 or 63.80%) of the participants are male while there are only 17 or 36.20% female participants.

It can also be seen from the table that majority (30 or 63.80%) of the participants are 18 years of age. Participants whose age is 19 are 11 or 23.40%, while there are 5 or 10.60% who are 17 years old and there is 1 or 2.10% among the participant who is 20 years old.

Participants who finished their Senior High School from a private school comprised most of the participants with 39 or 83.00%; while there are 8 or 17.00% participants who graduated from the public.

And the majority (24 or 51.10%) of the participants took the STEM strand of the Academic track in Senior High School. Nine or 19.10% of the participants took the ABM strand of the Academic track; 6 or 12.80% took the GAS strand of the Academic track; while there are 4 or 8.50% of the participants who took the HUMSS strand of the Academic track and the TVL track.

2. Cognitive Ability of the Participants

Table 3. Participants' Cognitive Ability When They Are Grouped According to Profile Variables

Profile		Cognitive Ability							
		AA		A		BA		Total	
		F	%	F	%	F	%	F	%
Course	BSCE	1	2.10	10	21.30	5	10.60	16	34.00
	BSCOE			6	12.80	5	10.60	11	23.40
	BSIT			11	23.40	9	19.10	20	42.60
	Total	**1**	**2.10**	**27**	**57.40**	**19**	**40.40**	**47**	**100.00**
Sex	Male			18	38.30	12	25.50	30	63.80
	Female	1	2.10	9	19.10	7	14.90	17	36.20
	Total	**1**	**2.10**	**27**	**57.40**	**19**	**40.40**	**47**	**100.00**
Age	17			3	6.40	2	4.30	5	10.60
	18	1	2.10	15	31.90	14	29.80	30	63.80
	19			8	17.00	3	6.40	11	23.40
	20			1	2.10			1	2.10
	Total	**1**	**2.10**	**27**	**57.40**	**19**	**40.40**	**47**	**100.00**
Type of SHS Origin	Public			4	8.50	4	8.50	8	17.00
	Private	1	2.10	23	48.90	15	31.90	39	83.00
	Total	**1**	**2.10**	**27**	**57.40**	**19**	**40.40**	**47**	**100.00**
SHS Track/Strand	ABM	1	2.10	1	2.10	7	14.90	9	19.10
	HUMSS			2	4.30	2	4.30	4	8.50
	STEM			18	38.30	6	12.80	24	51.10
	GAS			3	6.40	3	6.40	6	12.80
	TVL			3	6.40	1	2.10	4	8.50
	Total	**1**	**2.10**	**27**	**57.40**	**19**	**40.40**	**47**	**100.00**

As can be seen from the table above, the highest number of participants in the three courses (BSCE, BSCOE, and BSIT) has an Average cognitive ability with frequencies and percentages of 10 or 21.30%, 6 or 12.80%, and 11 or 23.40% respectively. The only participant who has an Above Average (AA) Cognitive Ability is taking up BSCE. Generally, majority (27 or 57.40%) of the participants have an Average (A) Cognitive Ability.

When the participants are grouped by sex, the highest number from both male (18 or 38.30%) and female (9 or 19.10%) have an Average cognitive ability. The only participant who has an Above Average cognitive ability is a female. It can also be noted that a high percentage of the participants (25.50% for male and 14.90% for female) have a Below Average level of cognitive ability.

The highest number from the participants whose age is 17 (3 or 6.40%), 18 (15 or 31.90%) and 19 (8 or 17.00%) have an Average cognitive ability. The only participant whose age is 20 has also an Average cognitive ability. The participant who has an Above Average cognitive ability is 18 years old.

As for the type of SHS Origin, participants who graduated from a private school have a higher number of those who have Average Cognitive Ability (23 or 48.90%) than those who have Below Average Cognitive Ability (15 or 31.90%). Whereas participants who graduated from a public school have an equal number (4 or 8.50%) of those who have Average and Below Average levels of Cognitive Ability. The only participant who has an Above Average Cognitive Ability graduated from a private school.

It can also be seen from the table above that a higher number of those who took STEM (18 or 38.30%) and TVL (3 or 6.40%) in Senior High School have an Average Cognitive Ability as compared to those who have Below Average Cognitive Ability with frequencies and percentages of 6 or 12.80% and 1 or 2.10 respectively. Participants who took HUMSS (2 or 4.30) and GAS (3 or 6.40%) have an equal number of those who have an Average and Below Average Cognitive Ability. However, for those who took ABM, the highest number has Below Average Cognitive Ability, yet the only participant who has Above Average Cognitive Ability took ABM in Senior High School.

3. Learning Styles of the Participants

Table 4. Participants' Learning Styles When They Are Grouped According to Course

Learning Styles	**Course**							
	BSCE		**BSCOE**		**BSIT**		**Total**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Social	4	8.50					4	8.50
Independent	1	2.10	3	6.40	1	2.10	5	10.60
Applied	1	2.10	1	2.10			2	4.30
Conceptual	1	2.10	3	6.40	5	10.60	9	19.10
Social Applied			1	2.10			1	2.10
Social Conceptual	4	8.50	1	2.10	2	4.30	7	14.90
Independent Applied			1	2.10	2	4.30	3	6.40
Independent Conceptual	4	8.50	1	2.10	3	6.40	8	17.00
Neutral	1	2.10			7	14.90	8	17.00
Total	**16**	**34.00**	**11**	**23.40**	**20**	**42.60**	**47**	**100.00**

Based on the above table, the learning styles of most of the BSCE students are Social (4 or 8.50%), Social Conceptual (4 or 8.50%), and Independent Conceptual (4 or 8.50%). For the BSCOE students, most of them have the learning styles of Independent (3 or 6.40%) and Conceptual (3 or 6.40%). Most of the BSIT students, on the other hand, have the learning styles of Neutral (7 or 14.90%) and Conceptual (5 or 10.60%). Generally, the highest number (9 or 19.10%) of the participants has a Conceptual learning style.

Students with Social learning style prefer extensive opportunities to interact with a variety of people typically found in instructional settings. Those with Social Conceptual learning style, on the other hand, prefer to interact with students and instructors and deal with language and conceptually organized materials and will likely feel frustrated if expected to work on solitary self-directed tasks involving everyday real-world settings. For those who have learning style of Independent Conceptual, they prefer to work alone toward individual goals and on highly organized language-oriented and conceptually organized materials and will tend to have frustrating experiences if required to spend a large proportion of time in activities that are socially interactive and consistently and closely tied to real-world experiences. The Independent type of learners prefers to work alone toward individual goals and is less interested in opportunities for social interaction than are average students their age. The Conceptual type prefers to work with highly organized language-oriented concepts and will be less satisfied with instruction that focuses on inducting learning from everyday real experience. And the

Neutral type may find it easy to obtain adequate, satisfying instruction with a wide variety of materials and approaches.

Table 5. Participants' Learning Styles When They Are Grouped According to Sex

Learning Styles	Sex				Total	
	Male		Female			
	f	%	f	%	f	%
Social	2	4.30	2	4.30	4	8.50
Independent	4	8.50	1	2.10	5	10.60
Applied	1	2.10	1	2.10	2	4.30
Conceptual	5	10.60	4	8.50	9	19.10
Social Applied	1	2.10			1	2.10
Social Conceptual	4	8.50	3	6.40	7	14.90
Independent Applied	1	2.10	2	4.30	3	6.40
Independent Conceptual	7	14.90	1	2.10	8	17.00
Neutral	5	10.60	3	6.40	8	17.00
Total	**30**	**63.80**	**17**	**36.20**	**47**	**100.00**

As can be seen from the table above, the most number (7 or 14.90%) of male participants have Independent Conceptual learning style followed by those male participants with Conceptual and Neutral learning styles with both having a frequency of 5 or 10.60%. The most number (4 or 8.50%) of the female participants, on the other hand, have a learning style of Conceptual, followed by the participants who have Social Conceptual and Neutral learning styles with both having a frequency of 3 or 6.40%.

Students with Independent Conceptual learning style prefer to work alone toward individual goals and on highly organized language-oriented and conceptually organized materials and will tend to have frustrating experiences if required to spend a large proportion of time in activities that are socially interactive and consistently and closely tied to real-world experiences. Those with Conceptual learning style prefer to work with highly organized language-oriented concepts and will be less satisfied with instruction that focuses on inducting learning from everyday real experience. Further, individuals with Neutral learning style may find it easy to obtain adequate, satisfying instruction with a wide variety of materials and approaches. And learners with Social Conceptual learning style prefer to interact with students and instructors and deal with language and conceptually organized materials and will likely feel frustrated if expected to work on solitary self-directed tasks involving everyday real-world settings.

Table 6. Participants' Learning Styles When They Are Grouped According to Age

Learning Styles	Age								Total	
	17		18		19		20			
	f	%	f	%	f	%	f	%	f	%
Social	1	2.10	3	6.40					4	8.50
Independent			3	6.40	2	4.30			5	10.60
Applied			1	2.10	1	2.10			2	4.30
Conceptual	2	4.30	5	10.60	2	4.30			9	19.10
Social			1	2.10					1	2.10

Applied										
Social Conceptual	1	2.10	4	8.50	2	4.30			7	14.90
Ind. Applied			2	4.30	1	2.10			3	6.40
Ind. Conceptual			5	10.60	2	4.30	1	2.10	8	17.00
Neutral	1	2.10	6	12.80	1	2.10			8	17.00
Total	**5**	**10.60**	**30**	**63.80**	**11**	**23.40**	**1**	**2.10**	**47**	**100.00**

The 17-year-old participants have the learning styles of Conceptual, Social, Social Conceptual, and Neutral. For the 18-year-old participants, the highest number (6 or 12.80%) of this group has a learning style of Neutral, followed by Conceptual and Independent Conceptual with both having a frequency of 5 or 10.60%. The 19-year-old participants have also different learning styles which include Independent, Conceptual, Social Conceptual, Independent Conceptual, Applied, Independent Applied, and Neutral. The 20-year-old participant has a learning style of Independent Conceptual.

The Conceptual learners prefer to work with highly organized language-oriented concepts and will be less satisfied with instruction that focuses on inducting learning from everyday real experience. The Social learners, on the other hand, are those who prefer extensive opportunities to interact with a variety of people typically found in instructional settings. Those students whose learning style is Social Conceptual to interact with students and instructors and deal with language and conceptually organized materials and will likely feel frustrated if expected to work on solitary self-directed tasks involving everyday real-world settings. Those with Neutral learning style find it easy to obtain adequate, satisfying instruction with a wide variety of materials and approaches. Moreover, learners whose learning style is Independent Conceptual prefer to work alone toward individual goals and on highly organized language-oriented and conceptually organized materials and will tend to have frustrating experiences if required to spend a large proportion of time in activities that are socially interactive and consistently and closely tied to real-world experiences. Those with Independent learning style prefer to work alone toward individual goals and are less interested in opportunities for social interaction than are average students their age. Students who have Applied learning style prefer to work on activities that have a clear relation to everyday real-world experiences and will likely feel frustrated with lectures, preparatory reading, and the extensive use of language as a medium of information exchange. And lastly, students who have Independent Applied learning style prefer to work alone toward individual goals and on materials closely related to real-world experience and will likely find less satisfaction working in socially interactive situations involving a high degree of language-oriented and conceptually organized materials.

Table 7. Participants' Learning Styles When They Are Grouped According to Type of Senior High (SHS) School Origin

Learning Styles	**Type of SHS Origin**				**Total**	
	Public		**Private**			
	f	**%**	**f**	**%**	**f**	**%**
Social			4	8.50	4	8.50
Independent			5	10.60	5	10.60
Applied	1	2.10	1	2.10	2	4.30
Conceptual	3	6.40	6	12.80	9	19.10
Social Applied	1	2.10			1	2.10
Social Conceptual	2	4.30	5	10.60	7	14.90
Independent Applied	1	2.10	2	4.30	3	6.40
Independent			8	17.00	8	17.00

Conceptual						
Neutral			8	17.00	8	17.00
Total	**8**	**17.00**	**39**	**83.00**	**47**	**100.00**

The most number (3 or 6.40%) of those participants who graduated from a public school have a learning style of Conceptual while the most number (8 or 17.00%) of those who graduated from a private school have learning styles of Independent Conceptual and Neutral.

Conceptual learners prefer to work with highly organized language-oriented concepts and will be less satisfied with instruction that focuses on inducting learning from everyday real experience. Those who are Independent Conceptual learners prefer to work alone toward individual goals and on highly organized language-oriented and conceptually organized materials and will tend to have frustrating experiences if required to spend a large proportion of time in activities that are socially interactive and consistently and closely tied to real-world experiences. And the Neutral learners find it easy to obtain adequate, satisfying instruction with a wide variety of materials and approaches.

Table 8. Participants' Learning Styles When They Are Grouped According to Senior High School Track/Strand

Learning Styles	**Senior High School (SHS) Track/Strand**										**Total**	
	ABM		**HUMSS**		**STEM**		**GAS**		**TVL**			
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Social	1	2.10			2	4.30	1	2.10			4	8.50
Independent	1	2.10			4	8.50					5	10.60
Applied					2	4.30					2	4.30
Conceptual	2	4.30	2	4.30	3	6.40	1	2.10	1	2.10	9	19.10
Social Applied							1	2.10			1	2.10
Soc Conceptual			1	2.10	2	4.30	3	6.40	1	2.10	7	14.90
Ind. Applied	1	2.10							2	4.30	3	6.40
Ind. Conceptual	1	2.10			7	14.90					8	17.00
Neutral	3	6.40	1	2.10	4	8.50					8	17.00
Total	**9**	**19.10**	**4**	**8.50**	**24**	**51.10**	**6**	**12.80**	**4**	**8.50**	**47**	**100.00**

The most number (3 or 6.40%) of participants who took the ABM strand of Academic Track have Neutral Learning Style. For those who took HUMSS strand of Academic Track, the most number (2 or 4.30%) of them have Conceptual Learning Style. Further, the most number (7 or 14.90%) of those who took STEM strand of the Academic Track have Independent Conceptual Learning Style. For those who took the GAS strand, the most number (3 or 6.40%) of them have Social Conceptual Learning Style. And the most number (2 or 4.30%) of those who took the TVL Track have Independent Applied Learning Style.

Learners with Neutral learning style find it easy to obtain adequate, satisfying instruction with a wide variety of materials and approaches. Those with Conceptual learning style prefer to work with highly organized language-oriented concepts and will be less satisfied with instruction that focuses on inducting learning from everyday real experience. The Independent Conceptual learners, on the other hand, prefer to work alone toward individual goals and on highly organized language-oriented and conceptually organized materials and will tend to have frustrating experiences if required to spend a large proportion of time in activities that are socially interactive and consistently and closely tied to real-world experiences. Further, the Social Conceptual learners to interact with students and instructors and deal with language and conceptually organized materials and will

likely feel frustrated if expected to work on solitary self-directed tasks involving everyday real-world settings. And the Independent Applied learners prefer to work alone toward individual goals and on materials closely related to real-world experience and will likely find less satisfaction working in socially interactive situations involving a high degree of language-oriented and conceptually organized materials.

4. Academic Performance of the Participants

Table 9. Participants' Academic Performance When They Are Grouped According to Profile Variables

Profile		Academic Performance					
		Good		Fair		Total	
		F	%	F	%	F	%
Course	BSCE	11	23.40	5	10.60	16	34.00
	BSCOE	10	21.30	1	2.10	11	23.40
	BSIT	20	42.60			20	42.60
	Total	**41**	**87.20**	**6**	**12.80**	**47**	**100.00**
Sex	Male	24	51.10	6	12.80	30	63.80
	Female	17	36.20			17	36.20
	Total	**41**	**87.20**	**6**	**12.80**	**47**	**100.00**
Age	17	4	8.50	1	2.10	5	10.60
	18	29	61.70	1	2.10	30	63.80
	19	7	14.90	4	8.50	11	23.40
	20	1	2.10			1	2.10
	Total	**41**	**87.20**	**6**	**12.80**	**47**	**100.00**
Type of SHS Origin	Public	7	14.90	1	2.10	8	17.00
	Private	34	72.30	5	10.60	39	83.00
	Total	**41**	**87.20**	**6**	**12.80**	**47**	**100.00**
SHS Track/Strand	ABM	8	17.00	1	2.10	9	19.10
	HUMSS	4	8.50			4	8.50
	STEM	19	40.40	5	10.60	24	51.10
	GAS	6	12.80			6	12.80
	TVL	4	8.50			4	8.50
	Total	**41**	**87.20**	**6**	**12.80**	**47**	**100.00**

Majority of the participants in the three courses considered in the study have Good Academic Performance with frequencies and percentages of 11 or 23.40%, 10 or 21.30% and 20 or 42.60% respectively.

It can also be seen from the table above that majority (24 or 51.10%) of the male participants and all female participants have Good academic performance.

Majority of the participants whose ages are 17, 18 and 19 have Good academic performance with frequencies or percentages of 4 or 8.50%, 29 or 61.70%, and 7 or 14.90% respectively. Moreover, the only participant whose age is 20 also has Good academic performance.

Majority of the participants who graduated from both public and private schools have Good academic performance with frequencies and percentages of 7 or 14.90% and 34 or 72.30% respectively.

Majority of the participants who took up ABM and STEM strands of the Academic Track in Senior High School have Good academic performance with frequencies and percentages of 8 or 17.00% and 19 or 40.40% respectively. Moreover, all the participants who took HUMSS, GAS, and TVL in Senior High School have Good academic performance.

Generally, the Academic Performance of the participants is Good.

5. Participants' Cognitive Ability, Learning Styles, Academic Performance and Profile Variables

Table 10. Chi-square Result of the Participants' Cognitive Ability, Learning Styles, and Academic Performance When They Are Grouped by Profile Variables

Variables	X^2	df	p value	Decision
Course	2.55	4	0.636	Accept H_o

Cognitive Ability	Sex	1.86	2	0.394	Accept H_o
	Age	2.79	6	0.835	Accept H_o
	Type of SHS Origin	.517	2	0.772	Accept H_o
	SHS Track/Strand	14.17	8	0.078	Accept H_o
Learning Styles	Course	29.54	16	0.021	Reject Ho
	Sex	5.19	8	0.737	Accept Ho
	Age	12.57	24	0.973	Accept Ho
	Type of SHS Origin	14.47	8	0.07	Accept Ho
	SHS Track/Strand	44.82	32	0.07	Accept Ho
Academic Performance	Course	7.97	2	0.019	Reject Ho
	Sex	3.89	1	0.048	Reject Ho
	Age	8.28	3	0.041	Reject Ho
	Type of SHS Origin	.001	2	0.980	Accept Ho
	SHS Track/Strand	3.474	4	0.482	Accept Ho

Chi-square test for significant difference in the cognitive ability of the participants when they are grouped by profile variables revealed the probability values of 0.636, 0.394, 0.835, 0.772, and 0.078 respectively. This suggests that significant difference does not exist in the cognitive ability of the participants by profile variables.

The result of the study is not consistent with the findings generated by some related research. The study of Guill, K., Ludtke, O., and Koller, O. (2017) showed that students who enrolled academic tracks demonstrated better mental ability score than students who enrolled other tracks.

When the learning styles of the participants are compared by sex, age, type of SHS origin, and SHS track/strand, the probability values of 0.737, 0.937, 0.07, and 0.07 were computed which suggests that there is no significant difference that exist. However, if the participants are compared by course, chi-square test reveals a computed value of 29.54 and a probability value of 0.021 which indicates the existence of significant difference, where majority of the BSCE students' learning style include Social, Social Conceptual, and Independent Conceptual; most of the BSCOE students, have the learning styles of Independent and Conceptual; and most of the BSIT students have the learning styles of Neutral and Conceptual.

Furthermore, the table above also shows the result of the test of significant difference in the academic performance of the participants when grouped by profile variables. The computed values of 7.97, 3.89, and 8.28 with probability values of 0.019, 0.048, and 0.041 respectively suggest that a significant difference exist when participants are grouped by course, sex, and age. However, when they are grouped by type of SHS origin and SHS track/strand, the computed values of 0.001 and 3.474 with probability values of 0.980 and 0.482 imply the non-existence of significant difference.

The present study's result is in a way consistent with the findings of the study of Moulay, S. H. and Fagroud, M. (2018) wherein they found out that girls are more likely to perform better than boys in different subjects.

6. Cognitive Ability, Learning Styles and Academic Performance

Table 11. Chi-square Result of the Participants' Cognitive Ability, Learning Styles and Academic Performance of the Participants

Variables	**X^2**	**df**	**p value**	**Decision**
Cognitive Ability and Academic Performance	.369	2	0.832	Accept H_o
Learning Styles and Academic Performance	1.688	8	0.989	Accept H_o

Cognitive Ability and Styles	Learning	17.410	16	0.360	Accept H_o

Chi-square test generated the probability values of .832 for Cognitive Ability and Academic Performance, 0.989 for Learning Styles and Academic performance, and 0.360 for Cognitive Ability and Learning Styles. The results show that no relationships exist among the three variables included in the study. This implies that Academic Performance cannot be determined by the participants' Cognitive Ability and Learning Style and that Cognitive Ability and Learning Styles are not associated with each other.

The result of the present study is in contrast with the findings of the study of Ruffing, S., Wach, F-S., Spinath, F.M. Brunken, R., and Karbach, J. (2015) where they found that general cognitive ability was positively correlated with academic grade. They concluded that the higher values of general cognitive ability and a more frequent application of learning strategies were associated with better academic performance.

VI. CONCLUSIONS

Based on the findings of the study, it can be concluded that course can contribute to the variation in the learning style of the participants. Also, course, sex, and age are viable factors that contribute to the significant difference in students' academic performance. However, participants' Cognitive Ability and Learning Styles are not predictive of Academic Performance, as well as Cognitive Ability and Learning Styles are not significantly related with each other.

REFERENCES

[1] Peng, P. Kievit, R., (2020). *The Development of Academic Achievement and Cognitive Abilities: A Bidirectional Perspective.* https://doi.org/10.1111/cdep.12352
[2] Huang, G., Xie, Y., and Xu, H. (2015). *Cognitive Ability: Social Correlates and Consequences in Contemporary China.* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4996474/#R19
[3] Michelon, P. (2006). What are Cognitive Abilities and Skills, and How to Boost Them. Retrieved from https://sharpbrains.com/blog/2006/12/18/what-are-cognitive-abilities/
[4] İlçin, N., Tomruk, M., Yeşilyaprak, S.S., Karadibak, D., & Savcı, S. (2018). *The relationship between learning styles and academic performance in TURKISH physiotherapy students.* BMC Medical Education. Retrieved from https://bmcmededuc.biomedcentral.com/articles/ 10.1186/s12909-018-1400-2
[5] Hawksworth, S. (2015). *Knowing Your Learning Style Can Help College Success*. Retrieved from https://collegepuzzle.stanford.edu/knowing-your-learning-style-can-help-college-success/
[6] Testprep-online.com (n.d.) *What is the OLSAT test?* Retrieved from https://www.testprep-online.com
[7] Canfield, A. (1988). *Canfield Learning Styles Inventory (LSI).* Western Psychological Services, USA
[8] Guill, K., Ludtke, O., and Koller, O. (2017). *Academic tracking is related to gains in students' intelligence over four years: Evidence from a propensity score matching study*. Retrieved from https://doi.org/10.1016/j.learninstruc.2016.10.001
[9] Moulay, S. H. and Fagroud, M. (2018). *The Effect of Gender on University Students' School Performance: The Case of the National School of Agriculture in Meknes, Morocco* https://www.vdu.lt/cris/bitstream/20.500.12259/35874/1/ISSN2335-8777_2018_N_9_1. PG_ 67-78.pdf
[10] Ruffing, S., Wach, F-S., Spinath, F.M. Brunken, R., and Karbach, J. (2015). *Learning strategies and general cognitive ability as predictors of gender-specific academic achievement*. Front.Psychol.6:1238.doi:10.3389/fpsyg.2015.01238