Gender and Age Differences in the Study Plan of University Students

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Abstract—An effective study plan is a predictor of good academic performance. However, there are few shreds of evidence available on the role of gender and age in the study plan for students. This paper investigated the role of gender and age in the adoption of a study plan that can guarantee success. A questionnaire was designed and administered to undergraduate students of a world-class privately funded university located in Ogun State, Nigeria. Simple random sampling was used and 294 students responded. Chi-square test of independence revealed that gender and age are not associated with frequency of study, study environment, study content preferences, and study motivation. There is no Gender difference in the preference of study type, factors that drive, motivation for study and satisfaction with the study plan whereas, age is significantly associated. The logistic regression model was significant and correctly classified 66.3% of satisfaction with the study plan. Gender was not significant but the age of students can predict their satisfaction with their study plan. Older students have more odds to be satisfied with their study plan. As students progressed from year one to the final year, they tend to adopt a study plan that can help them obtain high grades and graduate with good results. Timely academic advising or mentorship is advocated especially for freshers.

Keywords—Study plan, gender, age, statistics, Logistic regression, Chi-square, learning, Artificial Neural Network.

1 Introduction

An adequate study is needed for good academic performance, which can take the form of studying alone or in groups [1]. Group study can be a discussion class, tutorials or group project. Different arguments in this context point that group or collaborative study facilitates learning faster than studying alone [2]. Competition, self-motivation, peer pressure or desire for higher grades are some of the variables that can trigger the rate and frequency of study if factors such as medical, socioeconomic, psychosocial and sociodemographic factors are kept constant [3-4].

Technology in recent years has created a virtual, online, or mobile learning environment as against the traditional classroom environment [5]. Many students prefer to learn in a quiet and conducive study environment [6]. The propensity of covering course contents in a conducive learning environment differs in many aspects. These include the nature of the course, academic calendar, and other teacher-centered or student-centered factors. Adequate coverage of the course contents will lead to efficient learning, higher grades, and preparation for life after graduation. In addition, adequate lecture content helps in preparing the students for graduate studies [7]. Generally, researchers are divided on what leads to the students' satisfaction with their study plan or reading schedule. It appears that different learning environments and behavioral differences continue to make each of the research different but with similar conclusions.

This paper seeks to investigate the gender and age differences in the study plan or reading schedule of students in a world-class university in Ogun State, Nigeria. The university met some of the criteria of world-class statuses, such as effective teaching, quality research output [8-9], a conducive environment for learning, low attrition and high graduation rate [10-13]. This is a clear departure from the status quo as far as Nigeria is concerned [14-15].

2 Literature Review

2.1 Gender and age differences in cognitive abilities and pedagogy

Gender and age differences are often considered in research in cognitive abilities or pedagogy [16-18]. Two distinct hypotheses are usually stated, significant or not significant age or gender differences. Significant in this context implies if the studied phenomenon is affected by age or gender. The implications of the significance or otherwise are used to explain the implication for study, research or practice.

Significant gender differences: Significant gender differences imply that cognitive abilities or the effect of pedagogy have significant effects on gender. Hence, there is the presence of clear and noticeable differences in the way the gender responds to the studied phenomena. Significant gender differences were found to affect the following: manners of adoption of mobile learning resources [19-22], Reading preferences of electronic and hardcopy texts [23], assessment methods [24] and personalized learning and learning behaviors [25-26].

No significant gender differences: No significant gender differences imply that the effect of the study phenomenon is the same for males and females. That was observed in when there are no gender differences in using smart mobile devices for learning and electronic learning technology acceptance [27-29], computer-based test performance [30-31], and adopting flipped pedagogy [32].

Significant age differences: Early initiation of learning processes has been advocated to prepare the ground for future advancement. In addition, teaching children early in age will help stimulate their interest [33]. Nevertheless, significant age different imply that the effect of cognitive abilities and pedagogy is different

across the studied ages. Hence, some age group seems to respond faster or positively more than others. The significant age difference was observed in studies conducted to determine the extent of mobile learning devices adoption and usage [34-36]. Others are electronic learning adoption [37], social media learning adoption [38], blended learning adoption [39], learning goal [40] and self-assessment [41]. Significant age differences mean that different strategies have to be adopted to have the desired effects on the targeted age groups.

No significant age differences: No significant age differences imply that the effect of the study phenomenon is the same for all the ages. No age differences were observed in the investigation of the attitudes of undergraduates and postgraduate students' towards the adoption and utilization of mobile learning technologies [42-43]. In similar studies, the researchers found no significant age differences between paper-based learning and electronic learning [44] and learning how to use new electronic learning tools [45].

Gender and age differences are not the only variables; some authors have considered other factors such as level, entry requirements, education history, race, religion, and others. Moreover, gender and age differences are widely used and can easily be used to create distinct classes, which can easily be analyzed. Some cases can be seen in [46-49].

2.2 Factors affecting the students' study plan

Studies have shown that there are factors that influence the study plan or time spent by undergraduate students in universities. The factors are two-sided, positive and negative factors. The positive factors are those that predict good academic success while the negative factors are those predispose the students to non-performing or underperforming in their academic pursuit. Some of the factors are listed.

- **Health:** This is the most important predictor of academic progress as poor health reduces physical, mental and emotional activities. Students that are ill or have some ailments such as sickle cell anemia, asthma, and other similar ailments are most likely to spend less time on their studies. It is because their situation warrants that some sizeable time is allocated to the management of their health. The same applies to students with physical or learning disabilities [50]. The nature of a disability may require that more time is to be created for effective study.
- **Sporting activities and leisure:** Excessive physical activities can attenuate the time available for study, although sporting activities help in mental development [51]. Increased metabolism triggered by strenuous sporting activities can accentuate the sleep duration. Leisure and non-modifiable' activities can also affect the study time [52]. Traveling away from home for study can be associated with risky behaviors that greatly reduced the time spent on academic works [53]
- **Economic status:** Students from high-income families are more financially stable and as such can concentrate on their studies. On the other hand, students that are from low-income backgrounds have to source for more finances to augment the stipends received from their guardians and sponsors. In that circumstance, the

students have little choice than to work longer hours thereby shortening the available study and sleep time. Bursary and financial subsidies can help to create financial buffers for low-income students thereby freeing up time for them to study more frequently [54].

- **Psychological problems:** Psychological episodes and negative emotions can shorten the time spent on study or learning a task [55]. Academic activities can be attenuated in extreme cases where students are to be in mandatory observation to prevent self-harm or harm to others. Excessive stress can greatly decrease the amount of concentration needed for effective study. Depression, anxiety, and mind wandering are some of the psychological problems [56]. At times, some of the problems are triggered by short sleep duration because of long hours spent of study, sedentary behavior and other activities [57].

- **Parental linguistic input:** Studies have shown that parental verbal encouragement and praise helps students to study harder and attain academic success [58]. The parental linguistic input is more effective at infancy and it is a predictor of good academic success and perseverance in adulthood [59]. Students from broken homes, abusive, aggressive and alcoholic parents are most likely to be discouraged from an effective study [60].

- **Time spent on social media:** Advances in sciences have collapsed international boundaries leading to a faster medium of social interaction using technology. Social networking sites are heavily utilized for social interaction, the transmission of information and familial linkages. Students spent some time at social networking sites, which can affect the amount of time they spent [61]. Incorporating learning tools into social media platforms is a welcome initiative to secure the attention of the students and induce them to learn [62].

- **The study plan of students may be predicted by future career prospects and aspirations** [63]. Students that aspire to work in a certain organization after graduation can alter their study plan to accommodate other professional training such as certifications or skill acquisition training [64].

- Environment. Study environment has a role to play in encouraging or discouraging students from reading. A serene atmosphere and the well-equipped and spacious library is needed to ensure effective study [65]. The time spent on campus is the function of the environment [66]. Insecurity, political instability, and violent demonstration are likely to alter the study mode of students. So also are pollution (most especially noise pollution), weather, climate, and other geographical factors.

- **Time management:** Time is required for every academic activity. A study plan is a product of clear time management. Poor time management is a predictor of poor academic performance [67]. This is exacerbated when the student has no interest in the course of study [68].

- **Pedagogy:** How knowledge is imparted is an important variable of a study plan. A good teacher-student relationship usually results in efficient knowledge impartation and sustained by subsequent reading and study [69]. Study plan is affected by the availability of learning materials, modules and past questions and tutorial classes [70-71], mode of enrollment (dual or concurrent) [72], assessment mode (pen and paper, online) [73], degree of study mode (full-time, part-time, sandwich, distance

learning) [74], course loads and lecture time table [75] and mode of learning (blended, flipped, face to face) [76]. Others are the number of time allocated for teaching [77], self-testing and directed learning {78-79} and private tutoring [80].

The present study considered the frequency of study, study preferences, study environment, study content preferences, study motivation, factors that drive motivation and satisfaction that drive motivation for study.

3   Materials and Methods

3.1   Study area

The research was carried out in a world-class privately funded university located in Ogun State, southwest Nigeria.

3.2   Statistical methodology

A questionnaire was designed in such a way to address the stated objectives of the study. Simple random sampling was adopted in the administration of the questionnaire to the undergraduate students of the university. Part-time and postgraduate students were excluded. A pilot study was done and the inconsistencies noticed were corrected in the instrument of data collection. Five investigators distributed three hundred (300) questionnaires and 294 were successfully returned and analyzed using SPSS 23.0.

Cross tabulation was used to classify the variables because the data is in counts or frequency.

Chi-square test of independence was used to establish relationships between the response variables while logistic regression mythologies were employed to obtain the predictors of satisfaction with study plans.

4   Results

4.1   Descriptive statistics for the gender and age of respondents

Out of the 294 students that responded to the questionnaire, 135 (45.9%) were male and 159 (54.1%) were female. 62 (21.1%) were between the ages of 15 and 17, 124 (42.2%) were between the ages of 18 and 20, and 108 (36.7%) were aged 21 and above.

4.2   Frequency of study

The students were asked how often they studied or engage in academic reading. 82 (27.9%) responded that they studied daily, 119 (40.5%) stated weekly and 93 (31.6%)

noted that they only studied when it is close to the examinations. The gender and age cross tabulation on the frequency of study are shown in Tables 1 and 2.

Table 1. Gender and Frequency of Study

Frequency of Study	Gender		Total
	Male	*Female*	
Daily	41	41	82
Weekly	60	59	119
Close to exam	34	59	93
Total	135	159	294

Table 2. Age and Frequency of Study

Frequency of Study	Age			Total
	Between 15 to 17	*Between 18 to 20*	*21 and above*	
Daily	19	36	27	82
Weekly	28	50	41	119
Close to exam	15	38	40	93
Total	62	124	108	294

Pearson Chi-square (PCS) tests showed that gender and age are not associated with frequency of study (PCS = 4.802, p = 0.091) and (PCS = 3.176, p = 0.529) respectively. The pattern of frequency of study is the same for both the males and females, their ages notwithstanding, although 119 out of 294 students study on a weekly basis. Approximately, one out of three students studied close to the exam.

4.3 Study preferences

The students were asked their study preferences. 124 (42.2%) prefer to study alone, 112 (38.1%) prefer to study in a group of two and 58 (19.7%) prefer to study in a group of three and above. The high percentage of solitary study preferences is an indication that the students have access to study materials, textbooks and past questions and hence, they prefer to study alone. The gender and age cross tabulation on the study preferences are shown in Tables 3 and 4.

Table 3. Gender and Study preferences

Study preferences	Gender		Total
	Male	*Female*	
Alone	54	70	124
Group of 2	55	57	112
3 and above	26	32	58
Total	135	159	294

Table 4. Age and Study preferences

Study preferences	Age			Total
	Between 15 to 17	*Between 18 to 20*	*21 and above*	
Alone	37	54	33	124
Group of 2	19	40	53	112
3 and above	6	30	22	58
Total	62	124	108	294

Pearson Chi-square (PCS) tests showed that gender is not associated with study preferences (PCS = 0.767, p = 0.682). However, there is a significant association between age and study preferences (PCS = 17.896, p = 0.001). Males and females have the same study preferences patterns.

4.4 Study environment

The students were asked about their preferences of the suitability of their study environment. 184 (62.6%) prefer to study in a quiet environment, 30 (10.2%) prefer noisy environment and 80 (27.2%) prefer to study in a moderately quiet or noisy environment. The high percentage of those that prefer to study in a quiet environment could be an indication that the university is conducive and serene environment is needed for effective study. The result also indicates that the university has well-equipped and spacious library where students study in a quiet mode. The gender and age cross tabulation on the study environment are shown in Tables 5 and 6.

Table 5. Gender and Study Environment

Study Environment	Gender		Total
	Male	*Female*	
Quiet	90	94	184
Noisy	14	16	30
Moderately quiet/ noisy	31	49	80
Total	135	159	294

Table 6. Age and Study Environment

Study Environment	Age			Total
	Between 15 to 17	*Between 18 to 20*	*21 and above*	
Quiet	41	71	72	184
Noisy	2	15	13	30
Moderately quiet/ noisy	19	38	23	80
Total	62	124	108	294

Pearson Chi-square (PCS) tests showed that gender and age are not associated with the study environment (PCS = 2.327, p = 0.312) and (PCS = 6.918, p = 0.140) respectively. The desire for a quiet and serene environment is the same for all genders and ages.

4.5 Study content preferences

The students were asked if they studied outside their course contents. 69 (23.5%) admitted that they studied beyond their course content, 132 (44.9%) prefer to study within the given course content while 93 (31.6) admitted that they sometimes studied beyond their course content. This result is an indication that the students are just reading to pass their examinations and not eager to go beyond what the classroom can offer. The gender and age cross tabulation on the study content preferences are shown in Tables 7 and 8.

Table 7. Gender and Study Content Preferences

Study Content Preferences	Gender		Total
	Male	*Female*	
Yes	32	37	69
No	66	66	132
Sometimes	37	56	93
Total	135	159	294

Table 8. Age and Study Content Preferences

Study Content Preferences	Age			Total
	Between 15 to 17	*Between 18 to 20*	*21 and above*	
Yes	11	30	28	69
No	26	54	52	132
Sometimes	25	40	28	93
Total	62	124	108	294

Pearson Chi-square (PCS) tests showed that gender and age are not associated with the study content preferences (PCS = 2.300, p = 0.317) and (PCS = 4.205, p = 0.379) respectively. This result is an indication that the students are just reading to pass their examinations and not eager to go beyond what the classroom can offer.

4.6 Study motivation

The students were asked whether they are always motivated to study. 101 (34.4%) of the students responded 'yes' to the question, 53 (18.0%) responded 'no' and 140 (47.6%) responded 'sometimes'. This is an indication that the curricula of the various courses offered by the students need urgent review in order to address the problem of low motivation. The high unemployment in Nigeria can also be contributory factor.

The gender and age cross tabulation on the study motivation are shown in Tables 9 and 10.

Table 9. Gender and Study Motivation

Study motivation	Gender		Total
	Male	*Female*	
Yes	48	53	101
No	29	24	53
Sometimes	58	82	140
Total	135	159	294

Table 10. Age and Study Motivation

Study Motivation	Age			Total
	Between 15 to 17	*Between 18 to 20*	*21 and above*	
Yes	23	45	33	101
No	7	22	24	53
Sometimes	32	57	51	140
Total	62	124	108	294

Pearson Chi-square (PCS) tests showed that gender and age are not associated with the study motivation (PCS = 2.894, p = 0.235) and (PCS = 3.628, p = 0.459) respectively.

4.7 Factors that drive motivation for study

The students were asked what drives and motivates them to study always. 56 (19.0%) of the students stated that personal interest are what drive and motivate them to study, 52 (17.7%) admitted that their peer groups drive them to study, 156 (53.1%) believe that the drive to have high grades push them to study and 30 (10.2%) noted that there are other reasons best known to them. Reading solely for passing examinations can be attributed to this result. The gender and age cross tabulation on the factors that drive motivation for study are shown in Tables 11 and 12.

Table 11. Gender and Factors that Drive Motivation for Study

Drivers for Study motivation	Gender		Total
	Male	*Female*	
Personal interest	30	26	56
Peer group	23	29	52
High grades	69	87	156
Others	13	17	30
Total	135	159	294

Table 12.   Age and Factors that Drive Motivation for Study

Drivers for Study motivation	Age			Total
	Between 15 to 17	*Between 18 to 20*	*21 and above*	
Personal interest	16	29	11	56
Peer group	5	14	33	52
High grades	37	71	48	156
Others	4	10	16	30
Total	62	124	108	294

Pearson Chi-square (PCS) tests showed that gender is not associated with factors that drive motivation for study (PCS = 1.640, p = 0.650). However, there is a significant association between age and Factors that drive motivation for study (PCS = 29.489, p = 0.000).

4.8   Satisfaction with study plan

The students were asked if they are satisfied with their study plan. 100 (34%) of the students admitted that they are satisfied with their study plan while 194 (66%) are not satisfied with their study plan. This is an indication that there is prevalence of poor time management, poor lecture time table and stress. The gender and age crosstabulation on the satisfaction with study plan are shown in Tables 13 and 14.

Table 13.   Gender and Satisfaction with Study Plan

Satisfaction with Study Plan	Gender		Total
	Male	*Female*	
Yes	51	49	100
No	84	110	194
Total	135	159	294

Table 14.   Age and Satisfaction with Study Plan

Satisfaction with Study Plan	Age			Total
	Between 15 to 17	*Between 18 to 20*	*21 and above*	
Yes	28	54	18	100
No	34	70	90	194
Total	62	124	108	294

Pearson Chi-square (PCS) tests showed that gender is not associated with satisfaction with study plan (PCS = 1.576, p = 0.209). However, there is a significant association between age and satisfaction with study plan (PCS = 22.935, p = 0.000). Dissatisfaction with study plan increases as the students move from year one to final year.

4.9 Predictors of satisfaction with study plan

Logistic regression is employed to determine the extent to which gender and age of the respondents can predict their satisfaction with the study plan. The assumptions of logistic regression were violated as the dependent variable (satisfaction with study plan) is dichotomous, the independent variable (age) is ordinal and gender is categorical. Observations are independent since different students filled the questionnaires and Box-Tidwell test for linearity was positive. Since the gender is categorical, females in this case are to be compared with males, which acts as the reference category. The model summary is presented in Table 15.

Table 15. Model summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	356.907	0.066	0.091

The explained variance in the satisfaction with the study plan by the logistic model is poor, although the model is significant as obtained from the Hosmer and Lemeshow test which yielded a Chi-square = 9.471, degrees of freedom = 4 and p value = 0.050.

The classification table is presented in Table 16, which showed that the model was able to accurately classify the 66.3% of satisfaction with the study plan of the students with a cut value of 0.5.

Table 16. Classification Table for the Predicted Dependent Variable

Observed			Predicted		
			Are you satisfied with your personal study plan		*Percentage Correct*
			Yes	*No*	
Step 1	Are you satisfied with your personal study plan	*Yes*	13	87	13.0
		No	12	182	93.8
	Overall Percentage				66.3

The investigation of the contributions of the age and gender to the model is shown in Table 17. It can be seen that age added significantly to the model at p value = 0.000 as increase in the age of the students increases their probability of their satisfaction with their study plan.

Table 17. Variables in the equation

Variables	B	S.E.	Wald	D.F.	Sig.	Exp(B)
Gender(1)	-0.355	0.256	1.933	1	0.164	0.701
Age	0.729	0.174	17.511	1	0.000	2.074
Constant	0.031	0.248	0.016	1	0.900	1.032

The significance contribution of age to the logistic regression model implies that it can be used in prediction of the students'' satisfaction with some calculated probability. Artificial Neural Networks (ANN) model was applied, with age as the

only factor (independent factor) and no covariates. ANN used 203 (69%) of the data for training and 91 (31%) for testing. The model is presented in Table 18 and can be seen that both the cross entropy error and the percentage of incorrect predictions reduced after testing. The classification table is presented in Table 19. The model was able to accurately predict 71.4% of the dependent variable (satisfaction with study plan) using the age as the independent variable.

Table 18.　　　　ANN Model Summary

Training	Cross Entropy Error	127.886
Testing	% Incorrect Predictions Cross Entropy Error % Incorrect Predictions	36.5% 52.649 28.6%

Table 19.　　　　ANN Classification for the Model

Sample	Observed	Predicted		
		Yes	*No*	*Percent Correct*
Training	Yes	0	74	0.0%
	No	0	129	100.0%
	Overall Percent	0.0%	100.0%	63.5%
Testing	Yes	0	26	0.0%
	No	0	65	100.0%
	Overall Percent	0.0%	100.0%	71.4%

5　　Discussion and Conclusion

The gender and age of the students are not associated with the frequency of study. The pattern of the frequency of study is the same irrespectively of the age and gender of the student. Intervention programs are needed to encourage the students to study daily and to discourage them from waiting until close to the exams before they can study since this research showed that the students exhibit the same behavioral patterns in terms of frequency of study. Mobile technologies when adopted is likely to have the same effect in encouraging the students to study daily [28], [45]. Social media can be adopted and learning materials can be made available here since the students spent a substantial amount of time there [62].

There are no gender differences in the preference of study type whereas age is. The result has shown that as the students progressed from one level (year) to another, they tend to adopt study preferences, which are independent of gender. Those that could not study with friends are most likely to study alone until they graduate while those that have formed study groups are likely to continue until graduation, gender notwithstanding. The availability of learning resources [71] and good student-teacher relationship [70] are likely to encourage students to study alone

Gender and age are not associated with the study environment. The students are unanimous on the preferences for quiet and serene environment devoid of external disturbances [65].

There are no gender and age differences in the study content preferences. It can be observed from Table 7 that only 69 (23%) of the students study outside their given course contents. This is worrisome as the university is a place where students are expected to study beyond the scope given to them. The following strategies can be adopted to encourage the students to read beyond their course contents. They include term paper, discussion groups, group presentation, note preparation and others too numerous to mention. Dissatisfaction with the course of study could be implicated [68]. Additional skills have to be included in the curriculum to ensure that they are appropriately prepared for their career path since the present study showed that the majority of the students are not comfortable with the course contents [64]. This is an indication that their course contents do not prepare them for the challenges that are to face after graduation. An urgent review of the curriculum is needed.

Age and gender are not associated with the study motivation, however, more research is needed to reveal the variables that constituted the why the 140 (47.6%) students did not choose straight yes or no but rather chose 'sometimes'. High levels of unemployment sustained by steady population growth and inadequate planning can be the cause of low motivation. Often, graduates spent years looking for nonexistent jobs and the psychological trauma associated with that is enough to discourage young people aspiring to study in higher institutions of learning.

There are no gender differences in the factors that drive motivation for study whereas age is. The result has shown that as the students progressed from one level (year) to another, they tend to study harder to obtain high grades that are required for graduation [40]. Therefore, older students tend to study harder to make up for the shortcomings of their previous years. The high percentage of students (53%) that chose high grades as the main driver for their study motivation is expected and is independent of gender. Most of the students are aspiring to graduate with good results and that motivates them to study hard to obtain high grades in their courses.

Gender is not associated with satisfaction with study plan, whereas age is. Older students tend to be satisfied with their adopted study plan because of experience and drive for higher grades. Academic counselling is needed to advise the students on the suitable study plan that can increase their satisfaction.

The logistic regression revealed that age of students could predict their satisfaction with their study plan. Consequently, older students have more odds to be satisfied or dissatisfied with their study plan. They are satisfied if they are getting their desired grades and dissatisfied if they are underperforming. As students progressed from year one to the final year, they tend to adopt study a plan that can help them obtain high grades and graduate with good result.

Artificial Neural Network correctly classified 71.4% of satisfaction using only age as the only factor. The age of the students can appreciably predicts their satisfaction with their study plans.

6 Recommendation

The present study have identified that effective time management, serene environment, robust lecture time table, flexible curriculum and portable and rich learning resources are indispensable in improving the study time of students if successful academic performance is anticipated.

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