

# Factors affecting students desire to stay in physics program in Nigeria universities

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## Research Article

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# Abstract

This study investigated factors affecting student's desire to stay in physics program in Nigeria universities. The study was conducted using open-ended questionnaire. The participants in this study were second year and third year students in the Physics department in 15 universities in Nigeria. The completed questionnaire was analyzed using the Statistical Package for the Social Sciences program (SPSS, 19). Factors affecting student's desire to stay in physics program was presented. The outcomes of the study are encouraging in that the majority of students intended to stay in their physics program and continue their education. The students' decisions about their academic program are influenced by the subject matter, enjoyment of the subject, and career opportunities. For those who had decided to stay in the physics major, enjoyment of the subject was the most frequently reported reason. With enjoyment of the subject and content of the subject as the main reasons for continuing or switching program, this result implies that efforts should be undertaken to develop new courses, or to incorporate within existing courses, more interactive modes of learning, and to adapt the learners' needs.

## Introduction

Successful teaching should focus first on the learners (Brewer & Movahedazarhouligh, 2018; Kim et al., 2019; Schmoker, 2018). Beaton et al. (2021) found that, while many teachers believed their students were inadequately prepared, it was impossible to know whether the "unpreparedness" actually resulted from students' inadequacies or from unrealistic teacher expectations. Teachers must be concerned not only with what students learn, but also, with how and why they learn. People have a tendency to excel in, or at least to devote more efforts and energy to, the activities they want. Whether teachers realize it or not, students' learning is influenced by their attitudes, values, interests, and motivation.

Effective teaching requires knowing students and understanding how they learn. Better undergraduate education begins with a more complete and informed understanding of students and learning (Iloh, 2018).

Improving teaching should be based in part on a better understanding of our changing student body. These changes are no surprise to faculty; we have to accept change and experience the consequences daily in the classroom. Our improvement in practice should also be based on a better understanding of the learning needs of students enrolled in universities today. It is our responsibility as university teachers to understand how students have changed and to adjust our instruction accordingly. Moreover, improvement in teaching practice should be informed by seeing interconnections among students' experiences. A student's life is a web of interconnected experiences, influences, and activities, all of which interact in very complex ways. Faculty must better understand and respond to the fact that university learning is just one part of students' lives, cluttered additionally with work, family obligations, financial stresses, and sometimes personal problems. Teaching and learning are not an isolated island. To conduct teaching effectively, one cannot ignore these multiple influences. Success with students depends in part on clearer understandings of how today's universities have changed, and an acceptance of those

differences. Such understanding will help teachers to adapt their teaching so that it better connects with what we know about teaching and learning (Kalyani & Rajasekaran, 2018; Ramma et al., 2018; Subramani & Iyappan, 2018).

As discussed above, there is a need for studies of students' characteristics when they are entering university. This study will explore some of those characteristics, investigate factors affecting choice of majors, and address the question of why students continue to pursue a particular major.

## 1.1 Literature review

The study by Belser et al. (2018) found that the relationship between the field of education and career opportunities in that field to be the single most significant factor affecting the retention of science students after two or three years of study at university. Belser et al. used the same factors to explore what influences students' choice of major at the time of enrollment. These factors included family members, teachers or counselors, other adults, friends or fellow students, high school/college courses, work experiences, volunteer or travel experiences, students' own talents in the field, background in the field, personal enjoyment, interest, and the importance of the field as preparation for intended profession or career. Students in this study also reported that college courses had an effect on them. With respect to encouraging an interest in science, "students commented that they liked the course, or that the material was interesting, that it increased their interest in that field, or made them want to take more courses in the field, etc". Parental influences on the decision to study science were also reported in this study.

In a study by Hughes (2018), intended career also was reported as factor affecting students' retention in science. When looking at the reasons why students wanted to switch to other fields (from science), this study found that peer relations, instructional quality, and coursework contributed to students' decisions. This study suggests that "students who are highly motivated to make a contribution to society, to work with people (as opposed to things), to work in an attractive environment, and to have variety in their jobs are more likely to leave the sciences".

When looking for the causes of defection from science, Xu (2018) applied both quantitative and qualitative methods of research. Four factors were explored quantitatively: career plans, career motivations, education plans, and attributions for success. Students were asked if they would stay in science or not after graduating. Students were also asked what motivates them in seeking particular types of work. Education plans asked students if they would continue their education full time, or work and then return university, or plan to combine part-time study with work. And the last factor, attributions for success, explored students' perceptions of the causes of success in science. The qualitative component of the study involved interviews addressing the topics of peer group relationships, instructor-student relationships, and reasons for program choice. The study concluded that the majority of science students intended to stay in their field of choice and continue their education. In addition, there were few gender differences significant in this research.

## Methodology

The study was conducted using open-ended questionnaire. The participants in this study were second year and third year students in the Physics department in 15 universities in Nigeria. The completed questionnaire was analyzed using the Statistical Package for the Social Sciences program (SPSS, 19).

## Results And Discussions

389 physics students participated in the study. Table 1 shows the number of participants by years and gender.

Table 1  
Participants by year of study and gender

	Year of study		Gender		
	2nd Year	3rd Year	Male	Female	Total
Number of participants	271	118	211	178	389
Percentage %	70%	30%	54%	46%	100%

It is not enough to attract students to the field if they do not remain there. The results of this study found that the majority of students (78.7%) wanted to stay in physics even if they would have a chance to decide their major again. More details are show in Table 2.

Table 2  
Students' Responses Regarding Their Desire to stay in the Program

		Change		Stay	
		Count	Percentage	Count	Percentage
Overall					
Gender	Male	50	23.7%	161	76.3%
	Female	33	18.6%	144	81.4%
Year of study	Second year	52	19.3%	218	80.7%
	Third year	31	26.3%	87	73.7%
GPA	< 2/5	14	18.9%	60	81.1%
	< 3/5	47	21.5%	172	78.5%
	> 4/5	05	13.9%	31	86.1%

After answering about their thoughts, respondents were again presented with a list of possible influences on their thoughts about a field of study, and were asked to rate the importance of each factor with respect

to their choice of study. A five point scale was used (1 = not important at all, 2 = not important, 3 = somewhat important, 4 = important, 5 = very important).

### **3.1 Students Wanting to Change Their Major (change-students)**

Overall, nearly 70% of the respondents who want to change their major rated career opportunity as an important influence. Other factors rated by a majority of students as important to their decision were: content of subject (56.8%), course enjoyment (53.0%), and tuition fee (53.0%) (Table 3).

The mean ratings of all these items ranged from 2.18 to 3.91. On average, career opportunity and course enjoyment are significant important factors affecting students thought. Only one influence of peers was rated not important, the remaining items are somewhat important (Table 4).

### **3.2 Students Wanting to Continue Their Program (Stay-students)**

Overall, content of subject, course enjoyment, and career opportunity were rated as an important influences, in which over 80% of respondents rated course enjoyment as an important factor in their decision to continue the program. Other factors rated by a majority of students as important to their decision were: course difficulty (45.7%), relationship to instructors and peers (42.2% and 46.9%, respectively), and tuition fee (48.4%) (Table 5).

The mean rating of all these items ranged from 2.33 to 4.17. On average, course enjoyment, content of subject and career opportunities are significant important factors affecting students' thinking. Only one influence of peers was rated not important, the remaining items are somewhat important (Table 6)

From the results, we can see that the kind of factors influencing students' thought in both groups are nearly the same whether they would want to change major or stay in the program.

Table 3  
Percent's of Important of Factors Affecting Student's Thought by Change Students

Factors	Unimportant (rated as 1 and 2)		Somewhat important (rated as 3)		Important (rated as 4 and 5)	
	N	%	N	%	N	%
Content of subject, a	23	28.4%	12	14.8%	46	56.8%
Course difficulty, b	38	45.8%	11	13.3%	34	41.0%
Course enjoyment, c	17	20.5%	22	26.5%	44	53.0%
Quality of university & department organization system, d	42	51.2%	10	12.2%	30	36.6%
Relationship to instructors, e	41	50.0%	10	12.2%	31	37.8%
Relationship to peers, f	39	47.6%	16	19.5%	27	32.9%
Tuition fee, g	31	37.3%	8	9.6%	44	53.0%
Family and relatives, h	41	50.0%	13	15.9%	28	34.1%
Peers, i	53	65.4%	10	12.3%	18	22.2%
Career opportunity, j	10	12.2%	16	19.5%	56	68.3%

Table 4  
Mean Ratings of Important of Factors Affecting Student's Thought by Change-Students

	N	Minimum	Maximum	Mean	Standard deviation
Content of subject, a	81	1.00	5.00	3.41	1.35
Course difficulty, b	83	1.00	5.00	2.90	1.35
Course enjoyment, c	83	1.00	5.00	3.54	1.27
Quality of university & department organization system, d	82	1.00	5.00	2.78	1.52
Relationship to instructors, e	82	1.00	5.00	2.82	1.44
Relationship to peers, f	82	1.00	5.00	2.85	1.38
Tuition fee, g	83	1.00	5.00	3.22	1.44
Family and relatives, h	82	1.00	5.00	2.71	1.24
Peers, i	81	1.00	5.00	2.28	1.18
Career opportunity, j	82	1.00	5.00	3.91	1.28

Table 5  
Percent's of Important of Factors Affecting Student's Thought by Stay-Students

Factors	Unimportant (rated as 1 and 2)		Somewhat important (rated as 3)		Important (rated as 4 and 5)	
	N	%	N	%	N	%
Content of subject, a	40	13.1%	46	15.1%	219	71.8%
Course difficulty, b	92	30.3%	73	24.0%	139	45.7%
Course enjoyment, c	18	5.9%	37	12.1%	250	82.0%
Quality of university & department organization system, d	131	43.0%	69	22.6%	105	34.4%
Relationship to instructors, e	119	38.9%	58	19.0%	129	42.2%
Relationship to peers, f	101	33.1%	61	20.0%	143	46.9%
Tuition fee, g	120	39.5%	37	12.2%	147	48.4%
Family and relatives, h	147	48.2%	53	17.4%	105	34.4%
Peers, i	188	61.6%	59	19.3%	58	19.0%
Career opportunity, j	47	15.4%	71	23.2%	188	61.4%

Table 6  
Mean Ratings of Important of Factors Affecting Student's Thought by Stay Students

	N	Minimum	Maximum	Mean	Standard deviation
Content of subject, a	305	1.00	5.00	3.85	1.13
Course difficulty, b	304	1.00	5.00	3.12	1.18
Course enjoyment, c	305	1.00	5.00	4.17	.94
Quality of university & department organization system, d	305	1.00	5.00	2.77	1.31
Relationship to instructors, e	306	1.00	5.00	2.96	1.30
Relationship to peers, f	305	1.00	5.00	3.11	1.23
Tuition fee, g	304	1.00	5.00	3.13	1.44
Family and relatives, h	305	1.00	5.00	2.70	1.21
Peers, i	305	1.00	5.00	2.33	1.08
Career opportunity, j	306	1.00	5.00	3.67	1.24

### 3.3 Factors Most Affecting Students Desire

After rating how important each of the 10 items were as influences about decision changing or saying in physics program, respondents were asked to select the factor that had been the most important influence on their thinking at that time, and the second and third most important.

With stay-students, course enjoyment was the most important influence on their thinking with 43.3% students making that choice, overall. There was a diversity of choices for the second and third most important. Content of the physics program was chosen most frequently (39.7%), overall, as the second most important influence. Most frequently, 24.0% students said course difficulty was the third most important. Table 7 shows the percent of three most important factors rated by these students.

With change-students, career opportunity was the most important influence on their thinking with 45.1% students making that choice, overall. There was also a diversity of choices as the second most important. The content of the physics program was chosen most frequently (32.1%), overall, as the second most important influence. Most frequently, 26.5% students said course enjoyment was the third most important. Detailed percent's are showed in Table 8.

Table 7  
Three Most Important Factors Rated by Stay-Student

Factors	Third most important		Second most important		First most important	
	N	%	N	%	N	%
Content of subject, a	46	15.1%	121	39.7%	98	32.1%
Course difficulty, b	73	24.0%	112	36.8%	27	8.9%
Course enjoyment, c	37	12.1%	118	38.7%	132	43.3%
Quality of university & department organization system, d	69	22.6%	77	25.2%	28	9.2%
Relationship to instructors, e	58	19.0%	96	31.4%	33	10.8%
Relationship to peers, f	61	20.0%	111	36.4%	32	10.5%
Tuition fee, g	37	12.2%	79	26.0%	68	22.4%
Family and relatives, h	53	17.4%	92	30.2%	13	4.3%
Peers, i	59	19.3%	54	17.7%	4	1.3%
Career opportunity, j	71	23.2%	95	31.0%	93	30.4%

Table 8  
Three Most Important Factors Rated by Change-Students

Factors	Third most important		Second most important		First most important	
	N	%	N	%	N	%
Content of subject, a	12	14.8%	26	32.1%	20	24.7%
Course difficulty, b	11	13.3%	23	27.7%	11	13.3%
Course enjoyment, c	22	26.5%	19	22.9%	25	30.1%
Quality of university & department organization system, d	10	12.2%	13	15.9%	17	20.7%
Relationship to instructors, e	10	12.2%	17	20.7%	14	17.1%
Relationship to peers, f	16	19.5%	12	14.6%	15	18.3%
Tuition fee, g	8	9.6%	25	30.1%	19	22.9%
Family and relatives, h	13	15.9%	23	28.0%	5	6.1%
Peers, i	10	12.3%	16	19.8%	2	2.5%
Career opportunity, j	16	19.5%	19	23.2%	37	45.1%

### 3.4 Relationship between Students' Desire and Their Background

Exploring the relationship between student's desires about their thoughts of continuing or switching program and student's background by one-sample chi-square test, resulted in only one significant relationship: between student's answers and their living environment ( $\chi^2 = .72$ ,  $df = 1$ ,  $p < .05$ ). Other characteristics such as gender, years of study, student's GPA, and student's family characteristics showed no significant relationship at a probability level of .05. The importance of this finding is that the responses of second year students and third year students were similar, indicating that the things that influence a third year students thought are present and influential in the second year students.

The relationship between student's desires and their living environment (Table 9) suggests more students living in urban and suburban areas would want to switch physics program than students living in rural areas (24.8% and 14.0%, respectively). This result is similar to the finding regarding factors affecting a student's first enrollment. More students in urban or suburban areas chose to study physics without any clear goal, so that is the reason why more of them would want to switch physics program.

Table 9  
Student's Desires by Living Environment

	Living environment		Student's desire		Total
			Change	Stay	
Count	Living environment	Urban/suburban	66	200	266
		Rural	17	104	121
	Total		83	304	387
Expected Count	Living environment	Urban/suburban	57.0	209.0	266.0
		Rural	26.0	95.0	121.0
	Total		83.0	304.0	387.0
Percentage	Living environment	Urban/suburban	24.0%	75.2%	100.0%
		Rural	14.0%	86.0%	100.0%
	Total		21.4%	78.6%	100.0%
X <sup>2</sup> = 8.41, df = 3, p < .05					

## Conclusion

The outcomes of the study are encouraging in that the majority of students intended to stay in their physics program and continue their education. The students' decisions about their academic program are influenced by the subject matter, enjoyment of the subject, and career opportunities. The first two factors, the subject matter, and enjoyment of the subject, are related to the idea that students continue their education partly on the basis of whether their educational experiences have been satisfying. Career opportunities also are an important factor influencing students' decisions.

Disappointment about a perceived lack of opportunity to gain employment in physics after graduating was the main reason reported by students who decided to switch from the physics program. For those who had decided to stay in the physics major, enjoyment of the subject was the most frequently reported reason. This finding is consistent with the results of Tight (2020).

With enjoyment of the subject and content of the subject as the main reasons for continuing or switching program, this result implies that efforts should be undertaken to develop new courses, or to incorporate within existing courses, more interactive modes of learning, and to adapt the learners' needs. Again, although it is difficult if not impossible to draw definitive causal connections, it is feasible that a more "interactive" style of teaching and learning, in which students can develop their passions for study, may lead to higher retention in programs. More attention to providing the highest quality of instruction in introductory courses is likely to enhance the positive experiences students develop with the subject itself.

Increased attention should be paid to offering relevant experience outside the classroom for students. Providing opportunities for students to practice in industries or/and to participate in research projects, with associated mentoring, would offer students another route to discovering an affinity for scientific inquiry and methods, developing an interest in a particular problem, or becoming acquainted with positive role model.

## Declarations

### **Ethical statement:**

An application for ethical review was submitted to the Universities and approval was granted before the study was launched. A request was made to the office of the dean of education to gain access to the population. The dean of the faculty chose to describe the study to students through an announcement letter. A typed invitation from the researcher was then sent through the mail to each invitee requesting volunteer participation in the study. The invitation outlined details of the study and included a release form. The invitation indicated the purpose of the study, information about the researcher, anticipated time required, need for a signed release to participate in the study, ethical considerations and security. The invitation doubled as a release form. Before filling the questionnaire, participants were asked to sign the invitation/release form confirming that they understood the ethics, security, confidentiality, use of data, and voluntary right of refusal. Ethics were observed, permission from participants was obtained, and confidentiality in the data was considered by assigning numbers rather than names.

### **Consent statement:**

Participants were asked to sign consent form to participate.

### **Conflict of Interest:**

The author declares that he has no conflict of interest

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