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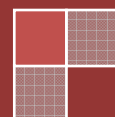
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Assessment of Students' Response to and Perception of Structural Analysis as a Course of Study in Tertiary Institutions

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ABSTRACT

When the purpose of a thing is not known, abuse becomes an inevitability. Education for Sustainability, as promoted by the United Nations is an essential tool for achieving sustainable development. This method of education is expected to foster creative thinking that will provide solutions to exiting societal problems. For sustainable development to occur, there has to be the proper transfer of knowledge and technology through teaching and other classroom activities. In the teaching of structural analysis, one of the encountered challenges has to do with the students' poor performance in the course in the first place. This study sought to identify the response and perception of students of structural analysis. A survey of three institutions was carried out and data was obtained through the distribution of well-structured questionnaires to students that offered structural analysis from Covenant University, University of Lagos and Yaba College of Technology. Data obtained from this survey were analyzed using SPSS, and then the agreement ranking of responses and perceptions were determined. The results were presented in form of frequency tables using relative importance index to get a clearer view of the most significant factors. The result showed in the response of students to structural analysis, that they acknowledge the importance of the course, despite any difficulty they might be facing, and also, they approach the course with fear and anxiety. The results also showed that even though the students understand the importance of the course, they are not interested in it. It was recommended that teaching methods that build interest in the students should be adopted such as the use of software and other technologies. This will demystify the learning of structural analysis. Problem based methods of learning should be adopted to as to build up interest and problem-solving capabilities in the students.

Keywords: Education for sustainability, teaching, structural analysis.

INTRODUCTION AND RESEARCH OBJECTIVE

There are several factors that have been identified as the contributor to students learning difficulties in which include, peer pressure, parental and home background, teacher's attributes, school environment, students interest in the subject, and socio-economic status of the student (Rilwani, 2014). However, most of the attention on students' academic performance has been placed on the teachers shoulders so that they are responsible for the success or failure of the students (Sabitu and Nuradeen, 2010).

According to Herr, (2013) the main challenge of structural education in architecture are the students trying to incorporate structural design into their applied design skills.

Furthermore, the school environment is also another critical factor affecting learning especially in the developing nations of the world, due to poor facilities and lack of appropriate teaching aids. for examples, there are some public schools in Nigeria that cannot afford enough chairs for their students, hence some of them have to stand for hours stretch receiving lectures, some institutions do not even have the right textbooks and resources to stimulate the interest of the student, also other environmental factors like improper ventilation, inadequate lightning and a host of them contributes to the difficulty in learning. This singular factor is what distinguishes the

performance of students in Africa to other developed nations of the world; (Rilwani, 2014). This has led to the question of what the responses of students in civil engineering and environmental sciences to structural calculations are?

The objective of this study was to assess the response of students offering structural analysis as a course.

LITERATURE REVIEW

There is hardly a general definition of learning that is acceptable in all circles (Shuell, 1986). Likewise, students also vary, and hence there are differences in the difficulties encountered by them. Rebecca & Richard (2005) suggested that motivation exists at different levels for students just as students have different approaches to learning. The diversities of student's approach to learning and orientation to studying were examined by Marton and Saljo, (1976), they came up with three different approaches in which they called the surface, deep and strategic approach to learning.

There are two broad factors that affect students' academic performance. These are internal and external factors, in which the internal factors include class size, learning facilities, environment of the class, innate ability of the student, motivation, complexity of the course material, teachers' role in the classroom, technology used in the class and the exam system (Irfan and Shabana, 2012). The external factors constitute social economic factors, extracurricular activities, family problems. Further research studies show that students performance depends on others such as gender and age differences (Hansen, 2000).

From several researches done, it has been seen that attitude plays a key part in successfully learning courses (Gilbert, 2001; Brandl, 2002; Desmarais, 2002; Doherty, 2002; Murday & Ushida, 2002)

According to Singh et al., (2017) achievement goal includes obtaining good grades, being appreciated by instructors, and recognized in peer groups and the feeling of accomplishment after solving critical problems. To get the best out of their students, instructors have been motivating their students for better performance and encouraged them to be competitive.

School environment when analysed has a great role to play in difficulties students' encounter, the more conducive the environment, the lesser the difficulties students' encounter. Social environment could mean a conducive learning environment, availability of good teaching aids (computers, teachers, laboratories, libraries etc.)

Students should be provided with facilities that enhance the learning environment because according to Fencil and Scheel, (2005), the right learning environment and pedagogies used by a teacher play an important role in students learning. Learning environment is made up of instructors teaching capability, class engagement, student- teacher ratio and student-student interaction, which influences an individual's motivation towards learning (Brophy, 1998; Pintrich & Schunk, 1996). Students will tend to be more engaged and connected in the learning process when they are trained in the proper environment (Brooks & Brooks, 1999).

Studies on the effect of teacher experience on student learning have found a positive relationship between teachers' effectiveness and their years of experience. The evidence currently suggests that inexperienced teachers are less effective than the more senior teachers Rivkin, Hanushek and Kain, (2000).

External factors constitute an environment that comprises factors that significantly affect students' academic performance. These environments may be physical or socio-physical such as sports, fraternities, clubs, cults, family relationships, romantic relationships, membership of organizations, or some form of extracurricular activities. These usually have a direct or indirect effect on academic performance.

Jayanthi et al. (2014) discovered that Student involvement in extracurricular activities lead to an improvement in cumulative GPA scores while Levine et al. (2014) observed that Most student-athletes held positive personal attitudes towards academic achievement, but their peers did not

METHODOLOGY

Area of study

The study was conducted in Covenant University, Ota and two Lagos universities, the first one which is University of Lagos, Akoka and Yaba School of technology. The reason for choosing these other two institutions in Lagos state universities was because one represented a federal government institution while the other represented a state institution.

Population of study

The targeted population for this study were students in 100-500 level studying any construction related courses basically architecture, building technology, Civil Engineering and Quantity surveying in covenant university, university of Lagos, and Yaba College of technology.

Data collection instrument

Data used for this research were obtained from using multiple choice structure questionnaires to answer the question of student's response to calculation based courses. The questionnaire was adopted from a rigorous review of the literatures used. The questions were in a 5-point Likert format ranging from (SD= strongly Disagree, D=Disagree, U= Unsure, A=Agree, SA=Strongly Agree) which were used to measure the respondent response and factors affecting the learning of structural analysis as a case study. the questionnaire consists of two sections.

Sample size

A sample consists of selected elements, subjects or observations from a given population. It is a finite part of statistical population of which properties are studied to gain information about the whole population. For the purpose of this research work, a survey was conducted and it was realized that all together in the three institutions there were more than a thousand students in the courses. Therefore, for this research work 195 questionnaires were distributed and 164 were retrieved which is 84.10%.

Research instrument for data analysis using Statistical package for social sciences (SPSS)

Statistical package for social science (SPSS) was used to process and analyse the information obtained from the questionnaire survey. Mean and agreement ranking were used to achieve objectives 2 and 3 as stated in chapter one by the use of SPSS. The result gotten would be made in a pictorial form for example pie chart and also frequency table for clarity of the analysis of the obtained data.

Descriptive tools

These are the tools used for describing the entire population or samples. This helps to show the relationships among the variables and other significant features. These tools are very useful in conveying quick impression of any clustering variations and possible trends in the value of variation. An example of such tools collected in the analysis of this data includes charts, frequency, percentages and measure of central tendency.

ANALYSIS AND DISCUSSION OF RESULT

In the first section, the personal data of structural analysis students were acquired through the self-administered questionnaires. Information such as gender, institution, levels and departments were analysed. The following were discovered

Covenant University had 77 respondents; university of Lagos (UNILAG) had 47 respondents while Yaba School of technology had 40 respondents. The following data shows that Covenant University had the highest respondent for the study, owing to the fact that it was the researcher's institution.

In order to get accurate information, and views from different sides, the entire department offering structural analysis were included in the research work. From the figure above building technology had 36.27% of the respondents, followed by civil engineering with 33.33%, also Architecture had 25.49% and lastly quantity surveying with 4.90% of the total respondent. The department of building technology has the highest number of respondents for this research work.

It was also observed that 100 level respondents had the lowest percentage at 4.90%, followed by 200 level respondents with 7.84%, 300 level respondents with 17.65%, 400 level respondents at 24.51%, then 500 level respondents which carries the largest percentage at 45.10%.

The reason 500 level respondents had the largest percentage was because the researcher assumed that, the respondents had spent quite a considerable time doing structural analysis, therefore with their experience they could provide accurate information.

The gender distribution of the respondents was as follows; it indicated that the male gender has 65.69% while the females have 34.31%. From this distribution, the male gender has a greater population than the females, the reason for this is not far-fetched as the construction industry is male dominated.

Table 1: shows the overall perception of students to structural analysis.

RESPONSES	MEAN	RANKING
Structural analysis is important because it feeds into other	4.24	1
I feel the lecturer has adequate knowledge and understanding of the course	3.87	2
There are student tutors who help my understanding of the course	3.81	3
I look forward to attempting the assignment given to improve my knowledge	3.73	4
I belong to a study group which helps my understanding of structural analysis	3.44	5
Structural calculation classroom is conducive for learning	3.34	6
I understand the lecturer and I am able to contribute often	3.3	7
I usually anticipate the course lectures because I enjoy it so much	3.11	8
I have difficulties transferring the knowledge I gain from examples treated in class to other equivalent structural analysis problems	2.55	9
I feel that this course is only necessary at the post-graduate level not undergraduate level	1.87	12
I prefer to sit at the back of the class because I would rather not be in class	1.92	11
I approach the course with fear and anxiety	2.49	10

Table 1 shows the overall response of students to structural analysis. From the table 1 the response “Structural analysis is important because it feeds into other civil engineering, building and architecture subjects I study” has a mean item score of 4.24. this ranked the highest. It was followed by “I feel the lecturer has adequate knowledge and understanding of the course” has a mean item score of 3.87. The third ranked response was “There are student tutors who help my understanding of the course” with a mean item score of 3.81. “I look forward to attempting the assignment given in order to improve my knowledge” had a mean item of 3.73. “I belong to a study group which helps my understanding of structural analysis” had a mean item score of 3.44, Structural calculation classroom is conducive for learning had a mean item score of 3.34, I understand the lecturer and I am able to contribute often had a mean item score of 3.30, I usually anticipate the course lecturer because I enjoy it so much has a mean item score of 3.11, I have difficulties transferring the knowledge I gain from examples treated in class to other equivalent structural analysis problems has a mean item score of 2.55, I approach the course with fear and anxiety has a mean item score of 2.49, I prefer to sit at the back of the class because I would rather not be in class is with a mean item score of 1.92, finally I feel that this course is only necessary at the post graduate level not undergraduate level had the least mean item score of 1.87.

Structural analysis is important because it feeds into other civil engineering, building and architectural subjects studied, had the highest mean in the table, therefore it was the most significant response.

From the data obtained, 141 out of 164 respondents agreed that structural analysis was important to them. This did not come as a surprise because most construction programs started structural analysis from their first year, to give them a good foundation and understanding of other structural related courses. This singular reason could have helped the respondents to figure out how vital the course is to them. More so the respondents attesting to the importance of the course shows that they regard it of inestimable value to their career regardless of any difficulty or challenge they might be facing in it.

The second significant response was that, their lecturers have adequate knowledge and understanding of the course. This implies that they have well learned lecturers with the right criteria and qualifications to pass across information to them.

Coming in third place is the presence of student tutors who help the respondents' understanding of the course. The effect this has on the second response is that, the lecturer having an adequate knowledge of the course doesn't guarantee that he passes on the knowledge to the understanding of the student, due to this the students organise tutorial amongst themselves to understand better what was not understood in class. According to research student understands more from their colleagues than from the lecturer.

As there are positive responses gotten likewise also are there negative responses. These are responses that ranked least on the table, the most significant of which is fear and anxiety towards the course. This is a generally accepted notion, that most student faces anxiety and fear when it comes to calculation based courses, because they feel it is hard and hence they might not understand it, even before attending the class. The second negative response is that student prefers to sit at the back, or they would rather not come for the class. This shows that they are very uninterested in the course even though they acknowledged its importance, also anxiety and fear could cause them to want to sit at the back or not attend the class.

Table 2: Agreement of responses amongst covenant university respondents, University of Lagos and Yaba tech respondent respectively.

Responses	Covenant university	Rank	University of Lagos	Rank	YABA College of Technology	Rank
I do not see the necessity of this course in the curriculum	1.6	13th	2.07	12th	1.58	11th
I have difficulties transferring knowledge I gain from examples treated in class to other equivalent structural analysis problems	2.63	9th	2.9	8th	2.08	10th
I prefer to sit at the back of the class because I would rather not be in class	1.81	11th	2.41	10th	1.58	11th
I feel that this course is only necessary at the postgraduate level not undergraduate level	1.69	12th	2.38	11th	1.54	12th
I look forward to attempting the assignments given to improve my knowledge of the course	3.58	4th	3.34	4th	4.42	2nd
Structural analysis classroom is conducive for learning	3.33	5th	2.93	7th	3.75	7th
I belong to a study group which helps me in understanding this course	3.21	6th	3.41	3rd	3.83	5th
There are student tutors who help my understanding of the course	4.04	3rd	3.41	3rd	3.79	6th
I feel the that the lecturer has adequate knowledge and understanding of the course	4.08	2nd	3.48	2nd	3.88	4th
Structural analysis is important because it feeds into other civil engineering, building and architecture subjects I study	4.25	1st	3.97	1st	4.58	1st
I approach the course with fear	2.33	10th	2.79	9th	2.42	9th
I usually anticipate the course lectures because I enjoy it so much	2.92	8th	2.92	6th	3.58	6th
I understand the lecturer and I can contribute often	3.04	7th	3.04	5th	3.92	3rd

From the table 2, it was observed that regardless of the institution, all students accepted that structural analysis was important, as this response ranked first amongst the three institutions visited. Furthermore, in agreement Covenant University and University of Lagos, ranked their lecturers having adequate knowledge and understanding of the course in second places respectively, likewise again, both have in third places that they have student tutors who help in their understanding of the course. In conclusion Covenant University and University of Lagos have agreement of response. The table also showed the general agreements between groups from the three institutions.

CONCLUSIONS

The study has explored the students' response and the factors affecting their learning of structural analysis. It was revealed that students are well informed of the importance of the course to their career; also, they know that their lecturers have adequate knowledge of the course, and furthermore they agree that practical examples are given in class. Students looked forward to assignments to help them do better at the course. Despite these positive responses, some students still approach the course with fear and anxiety, and prefer not to attend the classes, or sit at the back. Though this ranked least of the responses of students to structural analysis as a course. The responses were similar across all institutions surveyed.

RECOMMENDATIONS

1. Despite the students knowing the importance of the course and the lecturer being knowledgeable in the subject area, creative methods of imparting knowledge should be employed by the lecturers despite their knowledge of the courses. This will reduce the fear experienced by the students and develop the interest students in structural analysis.
2. Students should be encouraged to attend classes more regularly and efforts should be made by instructors/lecturers to allay the fears and anxieties the students experience. More assignments should be given to help with their understanding of structural analysis.
3. Public universities should admit the number of students they have enough resources for, so as to reduce the class sizes. Should in case they want to admit quite several students they should ensure that they are divided into groups and given different lecture times.

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