Evaluation of Students' Interests, Attitudes and Prospects in Studying Chemistry-Education at Tertiary Education Level among Students in Yola Metropolis Adamawa State, Nigeria

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Abstract

This study evaluated students' interest levels, attitudes, and prospects for studying chemistry education. The study formulated three (3) research questions, and answered the research questions to address the raised objectives. A descriptive survey research design was employed, where a 25-item instrument was administered to the respondents after subjecting the instrument to content validation and reliability testing. The study sampled 83 respondents using the Krejcie and Morgan table; however, only 51 copies of the questionnaires were completed and retrieved for analysis. Responses obtained were analyzed using descriptive statistics, precisely frequency count, percentage distribution, mean and standard deviation. The findings indicated that most learners expressed a strong interest in studying chemistry education, citing continuous intellectual challenges and the reinforcement of their attitudes through repeated learning experiences. More so, there was a highly perceived prospect of the course as it offers the students a professional experience and meets their expectations. Finally, this study recommends students' placement in course majors based on preferred choice and the use of well-developed and organized study strategies that enhance and shape students' study attitudes. The state and federal ministries of education should enhance employment opportunities for students pursuing Chemistry Education and other science-related disciplines while also providing competitive remuneration for teachers to encourage participation in the teaching profession.

Key words: Interest, Attitudes, Prospects, Chemistry Education

Introduction

The basic fundamental statement of educators' intention is to bring about permanent positive change in learners' perceptions about a particular subject of discipline through the use of various methods to impart knowledge and experiences that bring the learner to an improved state of experience with respect to the learning objective. The discipline of Chemistry is seen as the science of matter and its transformations while education is the training in a particular skill or profession, therefore, chemistry education as a field, deals with the process of training and learning chemistry through the procedural connections among research, theories and practices. Also, Chemistry education is described as the teaching and training provided by tertiary institutions to prepare individuals to be science educators in chemistry majors in the educational sector Christian, Emmanuel & Gonzagne, 2022).

Studying is an activity that students engage in all week schedules. For some, it is a joy, while for others, a struggle. So, teachers must find ways to address the wide range of studying abilities and differentiate their lessons to accommodate all skill levels. In addition to these varying skill levels, students have different backgrounds, motivation levels, and interests. Teachers could make better use of their time by knowing the interests of their students beforehand. They can learn about their students' interests in various ways–through student questionnaires, rating scales, or interviews.

The concept of students' interest covers a wide range of facts, such as the beginning, the sustenance, and the extent of interest to which the students adapt. Interest is therefore, both a psychological state characterized by increased attention, effort, and affect, experienced in a particular moment (situational interest), as well as an enduring predisposition to reengage with a particular object or topic over time (individual interest) (Hidi & Renninger, 2006). Students who discover academic interests in high school and college are better prepared for satisfying careers. Interest is a powerful motivational process that energizes learning and guides academic and career trajectories (Renninger & Hidi, 2016). Therefore, the interest these students felt in their learning significantly impact their feelings of success, and, ultimately, their performance.

Interest in this study means the study drive or the intrinsic motivational drive of a student and to what extent it is directed to pursuing the study major, which will reveal the individual's inner potential. The potential for Interest is in the person but the object and the environment define the direction of Interest and contribute to its development (Hidi & Renninger, 2006).

Attitude toward science is viewed as a combination of individual values, feelings and beliefs toward science (Hacieminеglu, 2016). Students' attitudes are also seen as the self-directed effort towards studying chemistry education which is sponsored by values as well as the feelings and beliefs of the individual students in their career pursuit.

Attitudes which deal with the formation of concepts or theories or practical experiences in students' cognitive, affective and psychomotor domain foster attaining the learning objective. Attitude toward science is viewed as a combination of individual values, feelings and beliefs toward science (Hacieminеglu, 2016). Students' attitude towards a subject is a key indicator of academic performance, therefore its enhancement is imperative for academic success, hence teaching and learning have been identified as a determinant of their academic performance (Christian, Emmanuel & Gonzagne, 2022). Students were given questionnaires that examined student self-perceptions, goal orientations, and interests (as they pertained to achievement). Researchers found that when students saw value and relevance in what they

were learning and how it could help achieve their goals, they were more likely to have increased interest, put forth effort, and graduate. Students must view their learning experiences as authentic and meaningful. Students are far more likely to put forth effort when they understand why they are doing a task. The impact and effect of students' intrinsic motivation are important for teachers to remember when presenting information in their classrooms.

Employment prospects are the state of the opportunities in view by the students concerning attaining the learning objectives of the major of study or course. Sumanasiri et al., (2015) stated that the concept of employability has different interpretations and understanding among the stakeholders of employability. They have also expressed that employability not only depends on the graduates' attributes but also on the faculty, curriculum, university's system of teaching and learning, employers' expectations, and many more. The knowledge and skills acquired by students are parts of the pivotal factors that could determine their prospects (Ajadi, 2023), moreover, certificates awarded by the universities seem not to be sufficient consideration to guarantee students employment which infers that there are other important indices which could enhance students prospects. (Ayanlowo, 2021) saw that the employment prospects of university students are currently a matter of great concern for stakeholders in education and the entire Nigerian society because securing employment is central to the pursuit of most students desiring to be awarded a university degree in Nigeria.

Statement of the Problem

Science education faces a significant challenge due to students' limited or lack of interest, which stems from several factors. Many students in tertiary institutions are assigned majors based on institutional decisions rather than personal aspirations, while large and unsupportive class sizes, ineffective instructional strategies, and a perceived lack of value in course content further contribute to disengagement. As a result, students develop a low self-directed attitude, reflected in minimal class attention, weak logical thinking, poor scientific problem-solving, and ineffective communication skills.

These challenges have led to uncertain career prospects in chemistry education, as many Nigerian graduates face unemployment or underemployment, diminishing undergraduates' confidence in securing a stable future. Consequently, there is a widening gap in the availability of trained professionals in chemistry education and related fields. Additionally, student interest and engagement are dynamic, influenced by continuous personal and

academic growth. Educators must recognize and adapt to these changes to foster sustained interest and participation in the field.

As such, this study aims to evaluate the students' interest, attitude and prospects in studying chemistry education; thus, this study aids in understanding of the underlying issues and bridging the identified gaps.

Students who study chemistry education (like all professional teachers) initially constitute their foundation of professional experiences in schools during their study years, where they are exposed to teaching practice as a core course at various secondary schools. Field Experience courses like teaching practice and microteaching are an important bridge between theories and practice (Giebelhaus & Bowman, 2002). This kind of course provides the opportunity for prospective teachers to expand their beliefs and perceptions of the teaching profession and equip them with the necessary skills required to excel in the teaching job.

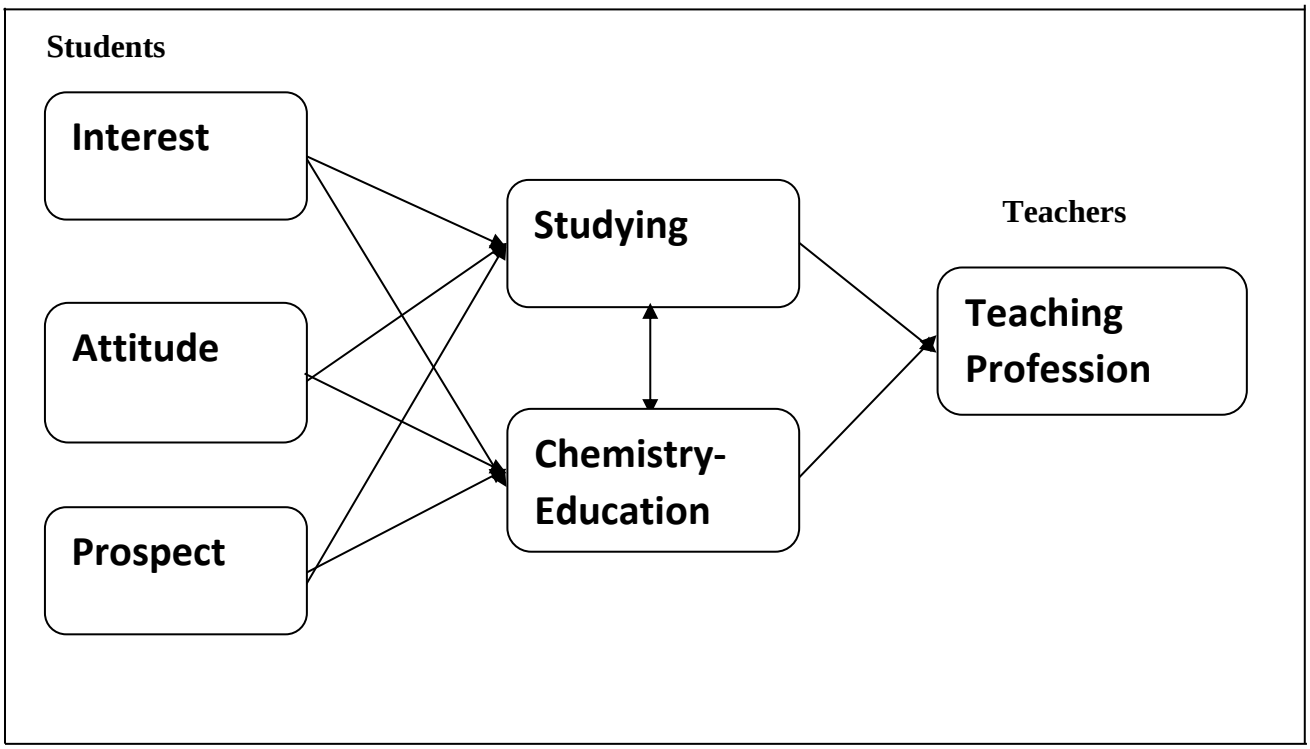

Fig1.1 Interest, attitude and prospects flow in studying chemistry education.

Methodology

A descriptive survey research design was employed to achieve this study's objectives. The approach will allow a comprehensive insight into the extent of interest, self-directed attitude, and prospects of students in chemistry education.

Population for the Study

The target population for this study consists of undergraduate students at various levels of studies from Modibbo Adama University, Sandwich degree program MAU and Federal College of Education, Yola. The population of students studying chemistry education at the aforementioned institutions is shown in Table 1 below.

Table 1: Study Population Distribution

S/No	Institution	Number of Students	Level of Study
1	Modibbo Adama University of Technology, Yola	96	100, 200, 300 & 400, 500 levels
2	Federal College of Education, Yola	248	NCE 1 & 2

Source: (Directorate of Academic Planning of MAUTECH and FCE Yola)

The population of the study is heterogeneous in nature, based on the schools and the levels of study. Therefore, the researchers applied the stratified sampling technique and selected a specific sample from each stratum based on the Krejcie and Morgan (1970) table for sample size. After this, purposive sampling was applied to ensure the selection of respondents with direct learning experience in chemistry education.

A structured questionnaire titled "Chemistry-Education Students' Interest, Attitude and Prospects Evaluation (CESIAPE)" was administered via face-to-face interaction with the respondents. The instrument was divided into two sections. Section A consisted of the students' demographic information, while section B consisted of 25 questions on students' interests, attitudes and prospects. Section B was designed according to the adapted four-point Likert scale, the close-ended questions were meant to give uniform responses to gain individual students' perceptions. The questions were divided into three domains (i) Interests of students towards studying chemistry education, (ii) Attitudes of students towards studying chemistry and, (iii) Prospects of students in chemistry education.

The reliability coefficient of the instrument was calculated using Cronbach's Alpha formula and established to be 1.00, as shown below:

A structured questionnaire was developed and used to collect data, this process was guided by a set of close-ended questions developed based on the research objectives to explore respondent interest, attitude and prospect to be used for analysis. The questionnaire asked students to choose their most preferred response; the close-ended questions elicited student responses about their study interests, attitudes and prospects. The instrument was administered to the selected participants by trained research assistants, the respondents were given time to study and complete the instrument and submit before the their schools close for the day.

The data obtained from the questionnaires was analyzed using descriptive statistics, precisely, frequency count, percentage, mean score and standard deviation to evaluate the Students' interests, attitudes and prospects in studying chemistry-education.

Results and Discussions

Table 1 Students interest in studying chemistry-education

Items	SD (%)	D (%)	A (%)	SA (%)	Mean	Decision
I applied to study this course because I like it.	4(10.53)	4(10.53)	12 (31.57)	18 (47.37)	9.5	Low Perception
I think I would change this course if I had my way.	15 (34.09)	13 (29.54)	7 (15.90)	9 (20.45)	11	Low Perception
I spent an average of 2 hours daily studying.	2 (5.13)	3 (7.69)	19 (48.72)	15 (38.46)	9.75	Low Perception
I attend my classes and practicals regularly.	3 (14.28)	2 (9.52)	0 (0.00)	16 (76.19)	10.25	Low perception
I am constantly being challenged to learn more therefore, I study hard.	1 (2.04)	1 (2.04)	29 (59.18)	18 (36.73)	12.25	High Perception
I am always excited and proud of studying this course.	1 (3.85)	4 (15.38)	0 (0.00)	21 (80.76)	11.5	High Perception
I think I am passionate about this course.	6 (13.04)	4 (8.69)	21 (45.65)	15 (32.60)	11.5	High Perception
I think I need additional motivation to make me continue studying this course.	2 (4.25)	5 (10.64)	25 (53.19)	15 (31.91)	11.75	High Perception
I am very interested in this course.	0 (0.00)	3 (6.00)	24 (48.00)	23 (46.00)	12.5	High Perception

Source*:* responses of students about interest based on the description under the items columns, SD strongly disagree, D disagree, A agree and SA strongly agree. The given value are a mean of the aggregate response, and inclosed is the percentage representation of the respective values. The weighted average of the whole response gotten from the the mean column given to be 11.2 (weighted average = 11.2) for decision basis, any corresponding mean of each item > 11.2 is described as high perception and any mean < 11.2 is described as low perception.

Table 4.1.2 Student's attitudes to studying chemistry education

Items	SD (%)	D (%)	A (%)	SA (%)	Mean	Decision
I always get myself prepared for classes/lectures.	1 (2)	1 (2)	32 (64)	16 (32)	12.5	High Perception
I pay attention to every detail taught in class.	2 (4)	4 (4)	26 (52)	18 (36)	12.5	High Perception
I complete my assignments and other related tasks such as lab reports on time.	1 (2)	2 (4)	30 (60)	17 (34)	12.5	High Perception
I put a great deal of effort into studying this course.	2 (4)	2 (4)	26 (52)	20 (40)	12.5	High Perception
My study habit guarantees to have excellent grades.	1 (2)	3 (6)	25 (50)	21 (42)	12.5	High Perception
I am committed and persistent in studying this course, even after a low performance on a test/exam.	3 (6)	2 (4)	26 (52)	19 (38)	12.5	High Perception
I am always motivated to keep studying this course.	1 (3.3)	4 (13.3)	5 (16.7)	20 (66.7)	7.5	Low Perception
I have linked what I've been taught in this course to another course-related task.	1 (2)	3 (6)	29 (58)	17 (34)	12.5	High Perception

Source*:* responses of students about attitudes based on the description under the items columns, SD strongly disagree, D disagree, A agree and SA strongly agree. The given value are a mean of the aggregate response, and inclosed is the percentage representation of the respective values. The weighted average of the whole response gotten from the value in the mean column given to be 12.1 (weighted average =12.1) for decision basis, any corresponding mean of each item > 12.1 is described as high perception and any mean < 12.1 is described as low perception.

Table 4.1.3 Students prospects in studying chemistry education

Description	SD (%)	D (%)	A (%)	SA (%)	Mean	Decision
Studying this course gives me an experience professionally'	1 (2)	3 (6)	29 (58)	17 (34)	12.5	High Perception
This course meets my expectations as a student-teacher.	1 (2)	5 (10)	32 (64)	12 (24)	12.5	High Perception
I would like to work as a teacher, after graduating.	3 (6)	8 (16)	22 (44)	17 (34)	12.5	High Perception
The teaching profession is designed for me.	4 (8)	8 (16)	22 (44)	16 (32)	12.5	High Perception
I would recommend that other students study this course.	3 (6)	4 (8)	28 (56)	15 (30)	12.5	High Perception
This course offers me opportunities beyond the teaching profession.	2 (4)	4 (8)	24 (48)	20 (40)	12.5	High Perception
I expect to complete my studies with high grades.	1 (2)	0 (0.00)	20 (40)	29 (58)	12.5	High Perception

Source*:* responses of students based on the description under the items columns, SD strongly disagree, D disagree, A agree and SA strongly agree. The given value are a mean of the aggregate response, and inclosed is the percentage representation of the respective values. The weighted average of the whole response gotten from the the mean column given to be 12.4 (weighted average = 12.4) for decision basis, any corresponding mean of each item > 12.4 is described as high perception and any mean < 12.4 is described as low perception.

Discussion

This study sought to determine the extent of students' interest in studying chemistry education, the items' statements were summarized with the learners' responses using the Linkert scale from strongly agree, agree, disagree to strongly disagree. The weighted average which is the sum of the product of the mean and the average weight divided by the sum of average weight was used to make decisions, drawing out findings.

The data analysis shows a verifiable fact that most respondents didn't apply to study this course, and also they think they would change this course if they had a way, they rarely attend classes and practical regularly, so therefore hardly spend an average of 2 hours daily studying. The low perception disagrees with the fact that situational Interest can be triggered based on increased exposure; according to the definition of Interest as both a psychological state characterized by increased attention, effort, and affect, experienced in a particular moment (situational Interest), as well as an enduring predisposition to reengage with a

particular object or topic over time (individual Interest) according to (Hidi and Renninger, 2006). Shows that even after the exposure of learners to situational Interest by their placement in chemistry education as they did not apply, the students' interest level is in dire need call for improvement, this low perception can be due to variables such as students' personalities, low attention or inability to drive a sense of fulfilment, perceived value about the course; as Students who see the value of a field of study experience greater involvement, more positive task attitudes, and greater identification with the domain (Brown, Smith, Thoman & Deemer, 2015) or the teacher's preparation and approach in tutelage. 'Teacher preparation policy could mandate courses on evaluating and adopting interest interventions in curricular, co-curricular and even extracurricular efforts (Deikman, Weisgram & Belangor, 2015).

On the other hand, majority of the students have high perception and their Interest in studying chemistry education is equally high, also they are constantly being challenged to learn more and therefore study hard. These categories of students are always excited and proud of studying this course as well as passionate about this course, felt the need for additional motivation to make them continue studying this course, have high rate interest in studying this course.. this is consistent with the four-phase model of interest development as triggered situational Interest can lead to maintained situational Interest, leading to emerging individual Interest and developed individual Interest, wherefore according to (Hidi & Renninger, 2006; Renninger & Hidi, 2016) these integrates these two perspectives and their development; particular situations trigger Interest, which can then develop across situations and over time to become more enduring. The key is having students actively work to find value for themselves. Indeed, self-generated utility-value connections are more powerful than externally provided utility-value information (as when teachers simply tell students that material is useful) in promoting Interest and performance (Canning & Harackiewicz, 2015). A utility-value intervention can help spark situational Interest in a topic, and it may help students connect that topic to their interests, which can build on individual interests.

This study also investigated the learners' attitudes towards studying chemistry education by assessing their level of agreement on the various statements on their study attitudes. Their self-directed attitude towards studying is presented in Table 4.2.

The results obtained in Table 4.2 above show that, the majority of the respondents have a high perception about their attitudes on this course as they get prepared for classes/lectures, pay attention to every detail taught in class, complete assignments and other related tasks such as lab reports on time, put a great deal of effort in studying this course, possessing good

study habit which guarantees excellent grades, committed and persistent in studying this course, even after low performance in a test/exams and have linked what I'm been taught in this course to other course related task whereas a hand few, have low perception on being always motivated to keep studying this course. The high perception as evaluated here supports that, students' attitudes toward a subject are key indicators of academic performance, therefore its enhancement is imperative for academic success, as well as towards science teaching and learning have been identified as a determinant of their academic performance according to (Christian, Emmanuel and Gonzague, 2022). Also, it shows that the learning outcome and achievement would be determined by the level of engagement and the amount of effort exerted by the learners, which is also contingent upon the kind of attitude and behaviour adopted and exhibited by the learners themselves (Langat, 2011). Further, elucidate, teachers who are experts in the subject being taught share their knowledge and expertise easily, allowing students to ask questions or give ideas and opinions on the subject and reflect them immediately, noting that student's achievement in the subject depends on their attitude to perform better (Yunus & Ali, 2018).

The respondents have their attitudes developed with the repeated experiences thereby framing a high perception about their attitude in studying chemistry-education which is consistent with attitudes as psychological orientations developed as a result of one's experiences which influences a person's view of situations, objects people and how to respond to them either positively or negatively or favourably or unfavourably according to (Mensah et al, 2013).

The prospects of students studying were determined also by their agreement based on their responses of the given statement items.

The analyzed data in the table 4.3 above reveals that the respondents have a high perception of their prospects in studying chemistry-education as it offers them an experience professionally, meets their expectations as student-teachers, prepares them to work as a teacher after graduating, believe the teaching profession is designed for them, they would recommend other students to study this course, it offers them opportunities beyond the teaching profession, and expect to complete their studies with high grades, which informs that, the most emphasized reasons in the light of prospective teachers' answers were to believe that profession is suitable for them and to be useful for the community according to (Kan, 2015). As stated by NUC (2021), chemistry education aims to enable students to acquire the various concepts, principles, theories, laws and relevant conceptual schemes to become effective classroom teachers. Therefore, the knowledge and skills acquired by students are parts of the pivotal factors that could determine their prospects (Ajadi, 2023).

Conclusion

This study is designed to evaluate the extent of students' Interest, self-directed attitude and prospects in studying chemistry education. It is observed that the majority of students perceived to have a high interest are constantly being challenged to learn more, while a few show low interest. It is also found that most students have a high self-directed attitude as they put a great deal of effort into studying this course, while the few with low attitudes have a constant need to be motivated to keep studying this course. The study reveals generally students studying this course have high prospects perception in the field of chemistry education as professionally trained teachers. It is noteworthy, to conclude that, students' interests, attitudes and prospects are key pillars to students studying chemistry education in higher institutions as their course major.

Recommendation

This study makes the following recommendations;

1. The institutions should place students in chemistry education based on students' preferred choice, instead of placement by institutional sole decision, as it informs the student's Interest in that field and aids in not producing teachers with no enthusiasm for the teaching profession.
2. The teachers should and can best enhance the student's Interest in this course by inculcating or exploring other teaching techniques by grouping a large class size, aiding more students' concentration and attention thereby interest development..
3. Students can best motivate their peers with low attitudes towards chemistry education on how to develop and excel by the use of well-designed and organized study strategies that suit this course as well as improve the student's performance.
4. The government and educational ministries should ensure high employability chances with remunerations for teachers as it encourages and gives a better prospective view for student teacher studying chemistry education, thereby asserting high hopes for the teaching profession.

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