

RELATIONSHIP BETWEEN ANXIETY AND CHOICE OF MATHEMATICS RELATED COURSES AMONG FEMALE STUDENTS IN TECHNICAL TRAINING INSTITUTES IN WESTERN REGION OF KENYA

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Abstract: Advancement in technology has influenced rapid development in developed countries across the globe (Kenya vision 2030, 2013). Developing countries are making efforts to emulate the developed countries and Kenya's vision 2030 is aimed at making Kenya an industrialized nation by 2030. Kenya has therefore embarked on training manpower at all levels of education, including post-secondary education. However, female students continue to lag behind male students in Science, Technology, Engineering and Mathematics (STEM) courses, with majority tending towards occupations such as nursing, secretarial jobs and social work. The purpose of this study was to investigate the relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes in Western Region of Kenya. Parson's Trait Factor Theory of career development informed the study. The study employed concurrent triangulation research design within the mixed method research approach using a target population of 1440 female students and 15 deans of students from 15 Technical Training Institutes in Western Region of Kenya. The sample size comprised of 302 female students (Krejcie and Morgan, 1970), 4 female student representatives taking mathematics related courses (purposive sampling), 4 female student representatives not taking mathematics related courses (purposive sampling) and 4 deans of students of the sampled TTIs (purposive sampling). Questionnaires and interview schedules were used as the main data collection instruments for the study. Validation of the instruments was ensured with the assistance of researcher's supervisors and reliability was ensured through Cronbach alpha and a reliability coefficient 0.723 was reported. Quantitative data was analyzed using descriptive statistics and inferential statistics while qualitative data was analyzed using thematic analysis. The study found a strong negative relationship ($r = -0.675$) between anxiety among female students and choice of mathematics related courses which was statistically significant ($p < 0.05$). This implies that statistically the more mathematics anxious the female students would be, the less likely they would choose mathematics related courses. The study concluded that there is a strong negative relationship between anxiety among female students and the choice of mathematics related courses which was statistically significant. The study recommends that mathematics teachers should teach students' study habits, raise student's confidence in their mathematical abilities and provide more practical tasks during mathematics classes. Mathematics teachers should also be trained to address anxiety problems of individual students. A study on demographic factors influencing selection of mathematical related courses would expound the current study.

Keywords: Anxiety, Female students, Mathematical related courses, Technical Training Institutes, Technical Vocational education and training Institutes (TVET), western region of Kenya.

1. INTRODUCTION

1.1 Background to the Study:

Students are constantly making decisions which affect their social as well as academic lives at the institution level and their decision making is greatly influenced by such affective factors as interest, anxiety, self-control among others (Muhammed & Dino, 2013). The anxiety of a student towards a subject determines their success or failure in that subject, thus students who are mathematically anxious participate less in mathematics classes, have fewer perceptions of mathematics ability and see little or no value of mathematics in everyday life (Ashcraft, Krause & Hopko, 2007; Ashcraft & Moore, 2009; Bala, Hyelni & Muhammad, 2016). Mathematics anxiety involves psychological arousal and negative cognitions in the immediate context of performance settings or in anticipation of future performance (Ashcraft, *et al.*, 2007). Mathematics anxiety is mainly caused by cumulative negative experiences in school as students encounter increasingly challenging mathematical material, leading to many students avoiding selecting mathematical based courses (Ashcraft, *et al.*, 2007; Beilock, Gunderson, Ramirez & Levine, 2010; Mohamed & Waheed, 2011). Thus, the main factors influencing student's attitude towards mathematics is associated with the students themselves, the school, teachers, and teaching; and home environment and society (Mohamed & Waheed, 2011).

In Malaysia students generally take courses geared towards employment and trades at technical secondary schools offering mechanical engineering, civil engineering, electrical engineering, agriculture, commerce, food management and fashion studies (Education in Malaysia, 2014). While this is the case, Lee (2012) observes that there has been a gradual drop in student enrolment in science and mathematical courses, a situation that has not helped in terms of getting trained and competent teachers and also teaching and learning materials for these two subjects especially in rural schools.

In Pakistan, students are discouraged from taking mathematics during their primary school years leading to a dislike for mathematics when enrolling in higher levels of education (Farooq & Shah, 2008). Program for International student assessment (PISA) studies from across 60 countries also support the notion that students with high levels of self-concept in mathematics perform better than their counterparts with lower levels of mathematical self-concept (OECD, 2013; PISA, 2012; Thien & Ong, 2015). Studies by UNESCO carried out in Africa further support the argument that a positive attitude towards mathematics enhances scientific, technical and vocational education among girls (UNESCO, 2012).

According to the European Commission (2010), in mathematics and science, the gender gap in mathematics observed in all European countries might be partly explained by the tendency of females to participate in higher-level school programs than their male counterparts. In addition, European commission (2010) indicates that International assessments of student achievement in reading, mathematics and science report some consistent gender patterns. The most visible and clear gender difference is the advantage of girls in reading. This advantage is consistent across countries, different age groups, survey periods and study programs. In mathematics, boys' advantage emerges in the later school years and is especially noticeable among students in the same study programs/streams and year groups (European commission, 2010).

A Spanish report shows that in intermediate vocational training, there are some pathways that are exclusively feminine, such as the ones related to health, body image and the textile sector, with a feminine presence of more than 90 % (IFIIE and Instituto de la Mujer, 2009). In contrast, other vocational pathways related to the automotive sector, electronics or computing reach a masculine presence of 80 % (IFIIE and Instituto de la Mujer, 2009). In Italy, girls outnumber boys in academic secondary schools, especially in pedagogy and social science courses (85 %) and in art schools (67 %), but boys predominate in technical schools (65.8 %) (ISTAT, 2009).

Similarly, in Sub-Saharan African (SSA) countries such as, South Africa according to Masanja and Butare (2010), female continue to lag behind men in education in general and specifically in Science, Mathematics and Technology (SMT) education, with women and girls tending to study programmes related to occupations such as nursing, secretarial jobs and social work. Programmes in engineering and pure sciences such as physics, chemistry and mathematics continue to be dominated by men and boys (Masanja & Butare, 2010). In Malawi, in spite of a number of gender equity policies and initiatives that encourage females to pursue careers within the fields of Science, Technology, Engineering, and Mathematics (STEM), females are under-represented in mathematics related fields (Mbano & Nolan, 2017).

In Nigeria, the general public has misunderstood the national policy of inclusiveness into commercial and technical colleges which they view as inferior to university education and discourage their children from attending such institutions

in favour of academically inclined institutions (Amaka, Favour & Laju, 2013). However, technical and vocational education is an important stream of the educational system in many societies due to its impact on diversified human resources development but in Nigeria, little or no attention is being paid to this aspect as witnessed by the under enrolment in the over 167 technical colleges in Nigeria (Amaka, *et al.*, 2013).

In Tanzania higher (University) education continues to register the highest growth among completing their studies while technical education has low student turnovers (Tanzania Education Sector Analysis, 2011). Additionally, mathematical courses attract very few students and their share in higher education has continued to drop 34% in the academic year 2003/04 which might ultimately hamper Tanzania's ability to keep abreast with rapid technological development and impact negatively on her economy (Tanzania Education Sector Analysis, 2011). This shows that low enrolment of female students in Technical Training Institutes (TTIs) is a problem in the African countries. Comparatively in Kenya, according to Government of Kenya Education System (2015) mathematics is compulsory at both the KCPE and KCSE examination levels. Kochung & Migunde (2011) observes that the choice of career is influenced by parents, friends and counselors mainly due to the fact that form four students make their career choices before taking their KCSE examination at a time where parents and peers still have much influence on their children's careers. The result of KCSE examination determines who joins university or lower post-secondary training institutions since admissions into various careers are determined by grades at the Kenya Certificate of Secondary Examination. Performance in mathematics at KCSE level is generally poor (KNEC, 2016) and students have over the years developed a negative attitude toward mathematics, which has a bearing on the choices form four leavers make when they enter post-secondary training institutions. This trend is a function of many factors, therefore the study sought to investigate the relationship between anxiety and choice of mathematics related courses among female students in technical training institutes in western region of Kenya.

Table 1.1: Enrolment data of students taking mathematics related courses in 2017 for three Technical Institutions in western region of Kenya.

Institution	Male	Female	Percentage
Gusii	1518	163	10.7%
Keroka	417	116	27.8%
Siala	54	3	5.6%
Total	1989	282	14%

Source: Directorate of Technical Education (2017)

Table 1.1 shows that the total enrolment of students taking mathematics related courses for 3 TTIs is 1989 males and 282 females in the year 2017 which give a percentage of 14% for female and 86% male. This trend suggests that female participation in mathematics related professions are likely to be affected and this gender imbalance presents a missed opportunity which should be seriously looked into.

1.2 Statement of the Problem

Female students joining post-secondary training institutions for career development tend to avoid courses which are mathematics related because of the social and environmental factors. Despite the opportunities brought about by TVET and various government interventions to ensure that TVET graduates are well equipped with the requisite practical skills for the job market as well as its benefits, it has still not attracted female students in Western Region of Kenya. Recently in Kenya, Female students started being admitted using Affirmative Action considerations to universities and institutions of higher learning with encouragement for them to take up sciences and technical courses. The government also included gender targets in the performance contracts to mainstream gender concerns within the public sector. However, Kenya is still faced with a wide gap between the genders which emanates from a strong paternal system among most communities as well as traditions and societal norms of the past. While this is the case, majority of female students who join technical training institutes opt out of taking mathematics related courses for their careers and this may derail the Kenya's sustainable development goal of achieving gender equality and empowering all women and girls. Therefore a need arose to investigate the relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes in Western Region of Kenya.

1.3 Purpose of the Study

The purpose of this study was to investigate the relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes in Western Region of Kenya.

1.4 Objective of the Study

The study objective was to examine the relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes in Western region of Kenya.

1.5 Research Hypothesis

The study was guided by the following hypothesis:

H_{01} There is no statistically significant relationship between anxiety and choice of mathematics related courses among female students in TTIs in Western region of Kenya.

H_{a1} There is statistically significant relationship between anxiety and choice of mathematics related courses among female students in TTIs in Western region of Kenya.

1.6 Significance of the Study

The findings may create awareness on the choice of mathematical courses among female students. Technical Training Institutes may benefit from improved female student enrollment into mathematics related courses. Deans of students may use the findings of the study to guide their female students with the choice of mathematics related courses. The results of this study may be of significance to the Ministry of Education as it unearths the relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes in Western Region of Kenya.

1.7 Scope of the Study

This study was limited to the Technical Training Institutes in Western Region of Kenya. It investigated the relationship between selected predictors and the choice of mathematics related courses among female students' in the targeted Technical Training Institutes in Western Region of Kenya between August and December 2019. The study was also limited only to the female students' representatives (not taking mathematics related courses), female students taking mathematics related courses and deans of students in the sampled technical training institutes. The study was confined to the influence of anxiety trait.

1.8 Limitations of the Study

The study was not able to take into considerations the contributions of all stake holders in all the technical training institutes in Western region of Kenya since this needed considerable time and resources. To overcome this the researcher ensured that the sample was large enough to be generalized in Western Region of Kenya.

1.9 Assumptions of the Study

This study was based on the following assumptions:

- i. That female students have varying levels of anxiety among themselves.
- ii. That female students exhibit a positive attitude towards mathematics related courses, but their attitude becomes less positive as they move forward to higher levels of education.

1.10 Theoretical Framework

The study was guided by the trait factor theory of career development by Parson's (1909). The theory outlines that the choice of a vocation depended upon: an accurate knowledge of oneself, thorough knowledge of job specifications and the ability to make a proper match between the two (Parsons, 1909). Traits were originally viewed as being biologically based and therefore unchanging. However, studies argued that traits are learned and subject to change (Zunker, 2011). The term 'trait and factor' implies a matching between individuals and jobs, and career selection occurs as a result of understanding the relationship between knowledge about self and knowledge about occupations (Sharf, 2013; Zunker, 2011). This

process clearly reflects Parsons' (1909) concept of vocational guidance and in doing so establishes his place as the founder of what is now known as trait and factor theory.

According to Parson (1909) trait and factor thinking portrays career decision-making as a cognitive process in which decisions are made on the basis of objective data. There is little, if any, consideration given to subjective processes or contextual influences. The process presumes that choice is available for everyone. In addition, career choice is viewed as a single, static, point in time event where there is a single right answer. Parson was particularly interested in the issue of helping young people to be marched with jobs that were right for them. Parson established a Vocational bureau in an immigrant district of Boston, where young people were interviewed and assessed, provided with information about possible career choices, and provided with opportunities to explore their feelings around the work they would like to do (McLeod, 2009).

The trait factor theory was relevant to the present study as it explains the basis on which meaningful choices can be made in the academic spheres of students as they pursue future career prospects. Parson states that occupational decision making occurs when people have achieved an accurate understanding of their individual traits like anxiety, interests and personal abilities and this is relevant to the present study.

2. LITERATURE REVIEW

Literature on Anxiety and choice of mathematics related courses among female students

In Malaysia, Rosli, Maat & Rosli (2017) in a study to determine the students' attitude towards statistics and statistical anxiety among postgraduate students in Faculty of Education. The study employed a quantitative design with a sample size of 199 (45 males and 154 female) respondents. Two sets of questionnaires, Survey of Attitude toward Statistics-36 (SATS-36) and Statistical Anxiety Rating Scale (STARS) were distributed among the students. Each of the questionnaires consisted of 42 and 51 items respectively. Based on the findings, students' attitude and statistical anxiety were both at a moderate level (neither too much nor too little). Addressing students' attitude and statistical anxiety is really necessary in promoting better learning and understanding in statistical literacy.

The subject on the reviewed study included only statistics as a mathematic related course hence there was need to establish and include the views of female students on all the mathematics related courses in TTIs a gap in literature which the present study filled. Moreover, the present study addressed the attitude and anxiety towards the choice of mathematics related courses among female students in technical institutes in Kenya.

Another study in Malaysia by Hasbee, Nur, Hong & Tan (2010) focused on the factors that caused mathematics anxiety among undergraduate students with the aim of determining the influence of parents, teachers, society and peers on the development of mathematics anxiety using a sample size of 73 undergraduate students from one public local university. A questionnaire was used to obtain the required data which included Mathematics Anxiety Rating Scale – Short Version (MARS-S). The relationships between the variables in the study were investigated using Pearson-product moment correlations. The results showed that the students have moderate level of mathematics anxiety and Teachers appeared to have the most influence on students' mathematics anxiety. The reviewed study employed only quantitative approach which lacked in-depth findings. Therefore, the present study saw the need to include the qualitative approach forming a mixed method approach obtaining corroborated and more reliable findings.

A study by Mahani & Molki (2011) aiming to identify factors that influence Emirati female students' decision to study engineering in United Arab Emirates. A sample size of 75 undergraduate female engineering students participated in the study. The participants were selected randomly from students enrolled in each of the four engineering programs. A questionnaire was used as the instrument for data collection. The questionnaire consisted of 20 closed-ended multiple choice questions, following a combination of dichotomous, polytomous and 5-point Likert scales. The results ($N = 75$, $M = 4.05$, $SD = 1.113$) indicated that 76.3% of the respondents professed their confidence (no anxiety) in their mathematical ability at high school. These results showed that parental support and strong mathematical abilities were noticeable factors in female students' decision.

In the reviewed study a sample size of 75 female students participated in the study which was a small sampling frame and questionnaire was the only instrument for data collection having closed ended multiple choice questions which could not

yield comprehensive result unlike the present study which sampled 302 female students a larger sample giving a more accurate representation of the population under study and used closed ended questionnaire and interview schedule that provided both quantitative and qualitative data that filled the literature gap.

A study in Parkistan by Asif & Saira (2011) whose purpose was to investigate the relationship between the mathematics anxiety, mathematics interest and mathematics achievement. The sample size comprised of 78 (32 male and 46 female) undergraduate students using Pearson correlation analysis to analyze the data. The results revealed that mathematics anxiety has significant negative correlation with mathematics interest and mathematics achievement. It was also found that mathematics interest and mathematics achievement have significant positive correlation. However, female students showed a higher level of mathematics interest and mathematics achievement than the male students. The reviewed study acquired only a small sample size, limiting the study's generalizability, a gap which the present study filled by acquiring a larger sample size for the study. Moreover, the reviewed study employed only quantitative approach which denied the study comprehensive findings. Hence there was need in the present study to include the qualitative approach forming a mixed method approach obtaining corroborated and more reliable findings.

Similarly, a study in Saudi Arabia by Hammad (2016) examined the relationship between future anxiety and specialization in the light of variables of gender and specialization. The sample consisted of 380 males and females at Najran University (200 students in Humanities and 180 students in scientific specializations). Descriptive statistics was employed and inferential statistics such as T Test, correlation coefficients and analysis of variance were applied. The study used SPSS 16 Data analysis software. The results showed a negative correlation between future anxiety and specialization, and there are differences in future anxiety for students of Humanity specializations, and gender differences in favor of males. Therefore, the study revealed that female students are more interested in humanity specializations than scientific specializations. The present study was seeking to explore the relationship between anxiety and the choice of mathematics related courses among female students in TTIs employing a mixed method research design unlike the reviewed study which used only quantitative data that could not yield a comprehensive finding.

Likewise, Scarpello (2009) investigated whether course and career choices were affected by mathematics anxiety using a mixed methods design consisting of quantitative and qualitative paradigms in South Eastern Pennsylvania. Sample size consisted of 298 students. This study used two quantitative instruments. The first instrument used was the researcher adapted Abbreviated 24-Item MARS-A from the 98-Item MARS-A to assess the level of student mathematics anxiety. The second quantitative instrument was the researcher developed Career Choice Survey, which was used to measure the student's level of career and mathematics efficacy and its influence on career choice. There was a negative correlation between mathematics anxiety and career efficacy. More than half of the students had moderate to high levels of mathematics anxiety and scored below the 50th percentile on the Career Choice Survey indicating low mathematics and career efficacy. The reviewed study acquired only a small sample size, limiting the study's generalizability, a gap which the present study filled by acquiring a larger sample size for the study. Moreover, the reviewed study employed only quantitative approach which denied the study comprehensive findings. Therefore, the present study saw the need to include the qualitative approach forming a mixed method approach obtaining corroborated and more reliable findings.

In another study done in Nigeria, Adamu (2013) analyzed the relationship between Mathematics Anxiety and Calculus Achievement among engineering students. The sample consisted of 148 (116 males and 32 females) year one students of Waziri Umaru Federal Polytechnic in Nigeria. Pearson correlation, paired samples t-test and Independent sample t-test were used to analyze data using SPSS version 20.0. The results obtained showed that Mathematics anxiety has insignificant negative correlation with Calculus achievement. It was also gathered that gender difference in Mathematics anxiety is significant while gender difference in Calculus achievement is not significant and Females exhibit high anxiety than males. The reviewed study acquired only a small sample size, limiting the study's generalizability, a gap which the present study filled by acquiring a larger sample size for the study. Moreover, the reviewed study employed only quantitative approach which lacked in-depth findings. Therefore, there was a need in the present study to include the qualitative approach forming a mixed method approach obtaining corroborated and more comprehensive findings.

The reviewed study employed descriptive survey research design with questionnaires as the instrument for data collection hence there was need to involve interview schedule too to enable the respondents express their views exhaustively and to express their feelings about the choice of mathematics related courses. Therefore, the present study filled the gap by

employing both questionnaire and interview schedule which enabled the respondents express their views exhaustively and gather in depth information obtaining integrated finding for the study.

In Kenya, a case study by Khaguya (2014) examined the relationship between gender-role stereotypes on enrolment in technical courses and population comprised students and staff of diploma technical institutions in Matili, Bungoma County. The sample size for the study involved 219 students who were selected using the Krejcie and Morgan formula for sample size calculation. Data were collected using questionnaires and interviews as the main research instruments. Data analysis was done using multiple regression and the findings presented in the form of tables. The study findings revealed that psychological perception factors of course masculinity influenced choice of technical courses among female students. The reviewed study limited itself to one institution and that denied the study an opportunity to collect views from female students in other institutions. Hence the present study filled the gap by conducting the study collectively in other 15 institutions obtaining views and feelings about mathematics related courses from all the female students.

3. RESEARCH METHODOLOGY

3.1 Research Design

The present study employed concurrent triangulation design within the mixed method approach to collect and analyze data. In this design the researcher collected numeric (quantitative) data and views, opinions and attitudes (qualitative data) of the respondents at the same time. The researcher analyzed the quantitative data followed by the analysis of qualitative data. The findings of the analysis of the two sets of data were then compared and interpreted (Creswell, 2014).

3.2 Area of Study

The study was carried out in the Technical Training Institutes of Western Region, Kenya which covers the Counties of Siaya, Kisumu, HomaBay, Migori, Kisii, Busia, Bungoma, Kakamega, Vihiga and Nyamira with a combined total of 15 Technical Training Institutes. Western Kenya region was chosen for several reasons: first, the Institutes are well developed to offer mathematics related courses. Second, no known study of this nature has been undertaken in Western region of Kenya TTIs.

3.3 Target Population

This study targeted a total of 1410 female students enrolled in mathematics related courses from the 15 TTIs in Western Kenya Region (Directorate of Technical Education, 2017). The study also targeted 15 female students' representatives (taking mathematics related courses), 15 female students' representatives (not taking mathematics related courses) and 15 Deans of students from 15 TTIs.

3.4 Sample size and Sampling techniques

The sample size consisted of 4 TTIs that were sampled by convenience sampling, 302 female students sampled by Krejcie & Morgan Formula (1970), 4 female students who passed mathematics and are taking mathematics related courses sampled purposively, female students who passed mathematics but did not take mathematics related courses also sampled purposively and 4 deans of students were also sampled purposively

3.5 Research Instruments

The present study utilized two research instruments to collect data from the respondents. The research instruments included questionnaires for female students; interview schedules for female students' representatives (taking and not taking mathematics related courses) and deans of students interview schedule.

3.6 Validity and Reliability of Research Instruments

Piloting of the study

A pilot study enabled the researcher to determine the reliability of the instruments according to Orodho (2005). In the conduct of pilot testing, efforts were made by the researcher to ensure the setting, choice of participants and interview methods was as close as possible to those intended in the main study. The researcher used the same criteria for selection of participants on questionnaires and interviews as was used in the main study (Dikko, 2016). The institution taking part

in piloting was selected purposively from the 15 TTIs and were not included in the main study, 30 female students from Bondo TTI were selected at random to take part in the piloting. (Connelly, 2008; Mugenda and Mugenda, 2008) suggested that a pilot study sample should be 10%-20% of the sample projected for the larger parent study. A pilot study may address number of logical issues and prior to the main research the following additional factors were resolved; checked that instructions are compatible, checked the wording of a survey, checked the reliability and validity of results and checked the statistical and analytical processes to determine if they were efficacious (Simon, 2011). To ascertain reliability of the questionnaire, Cronbach Alpha was used as a measure of reliability. Data was analyzed using SPSS version 25 to return Cronbach Alpha for the number of items in the scale. Questionnaire items on anxiety (Scale X) had a reliability coefficient of $\alpha = 0.733$.

Validity of Instruments

Any measuring device or instrument is valid when it measures what it is designed to measure (Weiner, 2007). Content and face validity were done with the assistance of expert supervisors from the Department of Educational Psychology of Jaramogi Oginga Odinga University of Science and Technology so that the instruments were appropriate for the study. The suggestions of the expert supervisors were incorporated in the instrument to improve its validity (Mugenda & Mugenda, 2008).

Trustworthiness of Qualitative Data

This study established trustworthiness by enhancing and adopting credibility, transferability, dependability and conformability. Trustworthiness of the present study was discussed with reference to its credibility which was ensured through sampling and signing of the consent forms, transferability was ensured by availing collected data to allow for applicability to other situations and through detailed methodological description and confirmability was ensured through in-depth methodological description to allow for deeper scrutiny of results

3.7 Data Analysis

This study analyzed and interpreted data using both quantitative and qualitative approaches. Quantitative data was analyzed descriptively while qualitative data was analyzed using thematic analysis.

3.8 Ethical Considerations

Creswell (2014) emphasizes that a researcher should obtain informed consent from the respondents to ensure that all information is given voluntarily. The researcher therefore looked at the issues of ethics in this study and addresses them before hand to protect the rights of respondents and the researcher. The researcher obtained permission from all the respondents and design consent letters for the respondents to sign before being allowed to participate in the study (Confidentiality). This study was conducted only on technical institutions in Western region of Kenya. The respondents were informed of the nature of the study and the purpose of the study and that the findings were used for academic purpose only. Questionnaires were destroyed after the research was complete. The questionnaires and interviews required no names; address or any identifiers that may link the information provided to the respondents for the purpose of anonymity.

4. FINDINGS AND DISCUSSION

Relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes

The first study objective sought to investigate the relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes. Anxiety influencing the choice of mathematics related courses among female students was measured using a 5- item 5-point Likert scale as on scale of 1 to 5 where 1 = strongly disagree (SD), 2 = disagree (D), 3 = neutral (N), 4 = agree (A) and 5 = strongly agree (SA). The data obtained was analyzed to show frequency of each response as well as percentage per item. The results are as shown in Table 4.1

Table 4.1: Frequencies and percentages for anxiety and the choice of mathematics related courses

STATEMENT	SA	A	N	D	SD
I get tensed when I hear a mathematics related course	168(60.6%)	52(18.8%)	24(8.7%)	14(5.1%)	19(6.9%)
I get nervous when I have to do mathematics course	151(54.5%)	41(14.8%)	37(13.4%)	19(6.9%)	29(10.5%)
I worry that I will not be able to use mathematics in my future career when needed	142(51.3%)	40(14.4%)	41(14.8%)	18(6.5%)	36(13.0%)
I worry that I will not be able to get a good grade in a mathematics related course if I have to do it	157(56.7%)	44(15.9%)	29(10.5%)	24(8.7%)	23(8.3%)
I feel stressed when listening to a mathematics teacher in class	163(58.8%)	61(22.0%)	18(6.5%)	16(5.8%)	19(6.9%)
I worry that I do not know enough mathematics to do well in a mathematics related course	169(61.0%)	38(13.7%)	34(12.3%)	20(7.2%)	16(5.8%)
Working on mathematics homework is stressful to me	144(52.0%)	72(26.0%)	22(7.9%)	19(6.9%)	20(7.2%)
I worry that I will not be able to complete every assignment in a mathematics course	160(57.8%)	53(19.1%)	30(10.8%)	23(8.3%)	11(4.0%)
I believe am the type who can do a mathematics related course	69(24.9%)	29(10.5%)	62(22.4%)	41(14.8%)	76(27.4%)
I feel that I will be able to do well in a mathematics related course	16(5.8%)	45(16.2%)	79(28.5%)	71(25.6%)	66(23.8%)
I feel confident when taking a mathematics related course	49(17.7%)	15(5.4%)	63(22.7%)	83(30.0%)	67(24.2%)
I worry I will not be able to understand the mathematics in an engineering class	165(59.6%)	47(17.0%)	42(15.2%)	12(4.3%)	11(4.0%)
I believe I can do mathematics in a mathematics course	48(17.3%)	32(11.6%)	21(7.6%)	92(33.2%)	84(30.3%)
I worry I will not be able to learn well in a mathematics course	164(59.2%)	51(18.4%)	42(15.2%)	13(4.7%)	7(2.5%)
I believe I can think like a mathematician	39(14.1%)	53(19.1%)	12(4.3%)	79(28.5%)	74(26.7%)
I feel confident when using mathematics outside of school	28(10.1%)	40(14.4%)	39(14.1%)	89(32.1%)	81(29.2%)

In Table 4.1 the study found that majority of the respondents at 60.6% strongly agreed with the statement that they got tensed whenever they heard of mathematics related course. It was also found that 18.8% agreed to this statement, while only 12% disputed as 8.7% remained neutral. This result revealed that mathematics anxiety is limiting and negatively influences students' future career choices, especially in Science, Technology, Engineering and Mathematics majors (STEM). This finding concurs with Rosli, Maat & Rosli (2017) in a study done in Malaysia which concluded that addressing students' attitude and mathematical anxiety is really necessary in promoting better learning of mathematics and understanding of mathematics related courses. The finding is also in line with a related study done in Nigeria by Okwelle & Alalibo (2017) which found among other things that genuine interest, self-confidence and the drive to succeed were key motivational factors why female undergraduates choose engineering programmes. While in Kenya, Munyingi (2012) concluded that academic factors, socio-cultural factors, economic factors and students' characteristics influences career choices among female students.

Similarly, during the interview session with one of the female students taking mathematics causes, she confessed that she gets tensed whenever she hears of mathematics; she said;

Sometimes I get tensed when I hear mathematics because am highly anxious about mathematics and will always avoid situations in which I have to perform mathematical calculations. Unfortunately, mathematics avoidance results in less competency, exposure and mathematics practice, leaving me to be more anxious and mathematically unprepared to achieve (FS 2).

This shows that tension during mathematics class or after hearing mathematics related course was attributed to high mathematics anxiety among the students. This results also revealed that the feeling of tension and anxiety interfere with manipulation and solving the mathematical problems in a wide variety of ordinary life and academic situations. Many students who suffer from mathematics anxiety have little confidence in their ability to do mathematics and tend to take the minimum numbers of required mathematics courses, which greatly limit their career choice options. The results also found that students who have a high level of mathematics anxiety have lower levels of mathematics achievement. This concur with a study done in USA by Wigfield & Meece (2018) which found that low performance on the mathematics related course among the students was related to mathematics anxiety and negative attitudes towards mathematics. Another study in Pakistan by Asif & Saira (2011) supported that mathematics anxiety has significant negative correlation with mathematics interest and mathematics achievement. In addition, according to Chipman, Krantz & Silver (2012) in Canada, fewer females take mathematics courses and choose career paths that require mathematics skills because of their high level of mathematics anxiety. If females are experiencing negative affective responses to mathematics, it could be that they are feeling incompetent or inferior to their male counterparts and are therefore less industrious in their pursuing mathematical skill and achievement (Chipman, Krantz & Silver, 2012).

On the contrary, (Lyons & Beilock, 2012; Young, Wu & Menon, 2012) in England found out that when high mathematics anxious individuals ramp up their resources associated with motivating behavior and integration of cognitive control before the choice of mathematics related courses, they show almost no mathematics deficit despite their mathematics anxiety. The finding also contradicts the studies done in USA, India and Nigeria by (Adamu, 2013; Ashcraft, 2002; Ayatollah & Venkatesan, 2009) which reported a non-significant correlation between mathematics anxiety and mathematics related course performance and selection.

Over two thirds of the respondents at 69.3% cumulatively supported the statement that they got nervous whenever they had to do mathematics course. Only 17.4% refused the statement, while 13.4% remained neutral. Majority of the respondents at over half (51.3%) strongly supported the statement that they worried that they would not apply mathematics in their future career. It was also found that 14.4% agreed to this statement, while 19.5% did not concur with the statement. Almost three quarters of the respondents at 72.6% cumulatively also confirmed that they got concerned that they would not be able to get good grade in mathematics related course if they had to do it. Only 17.0% indicated otherwise as 10.5% remained neutral. This implies that anxiety towards mathematics is present in many learners regardless of age, level of mathematical knowledge, gender and ability. This finding concurs with Rosli, Maat & Rosli (2017) in a study done in Malaysia which concluded that addressing students' attitude and mathematical anxiety is really necessary in promoting better learning of mathematics and understanding of mathematics related courses. Another study in Malaysia by Hasbee, Nur, Hong & Tan (2010) also revealed that the students have moderate level of mathematics anxiety and Teachers appeared to have the most influence on students' mathematics anxiety.

Consequently, during the interview with the female students, the study revealed that highly mathematics anxious students will be less fluent in computation, less knowledgeable about mathematics and less likely to have discovered special strategies and relationship within the mathematics domain, it was further revealed that during mathematics sessions, students invests less time and effort in learning and devote less concentration and attention to mathematics classes, one of them offered that;

My nervousness takes immediate effect in mathematics-related situations such as examinations or in a mathematics classroom. However, this affects me because it is influencing me over my academic and vocational choice. During mathematics session, I invest less time and effort in learning, organize my learning environment less efficiently, and devote less concentration and attention to a learning session (FS1)

This expression implies that although these female students took up mathematics related courses because they might have performed well in secondary schools, they were losing mathematics interest and would not be able to perform well in the long run. These findings also reveal that students' inability and unwillingness to do mathematics related courses contribute to their negative behavior towards mathematics. If that inability and unwillingness become too much, it may rise to their uncomfortable feeling and lack of confidence in performing activities related to mathematics.

This finding concurs with Asif & Saira (2011) in a study done in Pakistan which found that mathematics interest and mathematics achievement has significant positive correlation. Asif & Saira (2011) revealed that the performance of the

students in Mathematics related courses is influenced by the mathematics anxiety. Similarly, a study by Mahani & Molki (2011) in United Arab Emirates showed that parental support and strong mathematical abilities were noticeable factors in female students' decision. This finding is also in accord with Wataka (2013) in a study done in Kenya, that students in mathematics related courses did not require high-level mathematics ability but tended to have significant levels of mathematics anxiety and as they progressed through middle/junior high school, they were losing confidence in their ability to be successful in their academic mathematics courses. However, the results contrast with the studies of (Kyande, 1986; Smith & Dengiz, 2010; Tully & Jacobs, 2010) done in Malaysia and Australia which found that students who have high mathematical abilities are more likely to pursue a mathematics related course.

The present study also found that more than half of the respondents at 56.8% strongly agreed with the statement that they felt stressed when listening to a mathematics teacher in class. In fact, two thirds of the respondents at 61.0% revealed that they got worried over their limited knowledge in mathematics to perform well in mathematics related courses. Only 12.7% and 13.0% cumulatively disputed the statements respectively. This showed that a high level of anxiety is associated with a lower level of performance which is consistent with the findings of (Scarpello, 2009; Rosli, Maat & Rosli, 2017) in Pennsylvania and Malaysia which showed that student's attitude and mathematical anxiety existed among students. This result also concur with a study done in Parkistan by Asif & Saira (2011) which revealed that mathematics anxiety has significant negative correlation with mathematics interest and mathematics achievement in mathematics related courses.

Moreover, during an interview, one of the female students who passed mathematics but not taking mathematics related courses confessed that she would panic during mathematics exams or lessons. This shows that lack of confidence when working in mathematical situations is the cause of mathematics anxiety. The interview further revealed that students who have high level of mathematics anxiety had a low level of mathematics related course interest and vice versa. She said:

I did not want to take up mathematics related courses because of the demanding nature of the courses and mathematics concepts. In most cases, I would panic during mathematics exams or lessons. Panic is a turbulent in the mind, a kind of mental frenzy. The mind may also freeze and I may experience physical tension and rigidity. (FS 3)

This further reveal that some students do not like mathematics simply for the reason that they are scared of it and do not feel like they are able to understand the concepts. The same students who have this fear of mathematics do not try as hard to understand and finish their homework as students who do not have this fear. The students who have a fear of mathematics assume that if they do not understand the homework the first time, they will never understand it. In contrast, a study done by Ashcraft (2002) in USA revealed that no significant relationship is found between the variables and it is probably attributed to the nature of the mathematics anxiety and differences between this kind of anxiety and general anxiety. Ashcraft (2002) further added that Mathematics anxiety as a special kind of state anxiety occurs in the academic situations which are not compatible with the obtained results from the academic hardiness of the mathematics related courses. This finding is also contrasting with Ayatollah & Venkatesan (2009) in India which found that mathematics anxiety has significant negative correlation with mathematics performance but no significant correlation is detected with academic hardiness.

However, this finding is in accord with a study by Scarpello (2009) in Pennsylvania which found that there was a negative correlation between mathematics anxiety and career efficacy. More than half of the students had moderate to high levels of mathematics anxiety and scored below the 50th percentile on the Career Choice Survey indicating low mathematics and career efficacy. Scarpello (2009) further found that Fifty-six percent of the students did not enjoy performing the career related mathematics required by their vocational-technical education lab curriculum. (Rosli, Maat & Rosli, 2017) also found that students who demonstrated low mathematics anxiety tended to be enrolled in vocational-technical education labs requiring higher mathematical ability. These students also did well in their mathematics courses in elementary, middle/junior high and high school.

Over three quarters of the respondents at 78.0% supported the statement that working on mathematics homework was stressful to them, with only 14.1% cumulatively indicating otherwise, while 7.9% remained neutral on the statement. Another 76.9% of the respondents worried that they would not be able to complete every assignment in mathematics course, with only 12.3% indicating otherwise. These results revealed that the students have high level of mathematics

anxiety. Mathematics anxiety could develop as a result of a student's prior negative experiences while learning mathematics in the classroom or at home which tend to influence female students' choice of mathematic related courses in TTIs. These findings concur with those of (Ashcraft & Ridley, 2015; Garry, 2005) in Philadelphia which found that in academic settings, mathematics anxiety affects an individual in any school related activities, in classrooms and standardized test taking. Scarpello (2009) in Pennsylvania also revealed that more than half of the students had moderate to high levels of mathematics anxiety and scored below the 50th percentile on the Career Choice Survey indicating low mathematics and career efficacy. These findings echoed those statements made during the interview with female students who did not take mathematics courses. One of them expressed:

The thoughts of doing poorly in mathematics interfere with my concentration on mathematics test, in fact, I could freeze up on some important tests and while taking tests I had an uneasy, upset feeling and during tests I feel much tensed (FS 3)

This shows that inability to tackle mathematics problem and finish up every mathematics assignment in mathematics related courses was due to high level of mathematics anxiety among the students. This result further reveal that the feeling of tension and anxiety interferes with manipulation and solving of mathematical problems in a wide variety of ordinary life and academic situations. Mathematics anxiety affects students' confidence in Mathematics related courses. Many students who suffer from Mathematics anxiety have little confidence in their ability to do mathematics and tend to take the minimum number of required mathematics courses, greatly limiting their career choice options. A study by Clute (2014) in California also found that there was a significant relationship between mathematics anxiety and mathematics performance. It means that students who have high mathematics anxiety tended to perform fewer score in mathematics performance. However, those who have low mathematics anxiety tended to perform high score in mathematics. The findings also confirm pervious findings in USA, which report significant relationships between mathematics anxiety and mathematics related career choice (Lee, 2016; Ashcraft, 2011).

However, these findings contrast with those of (Ashcraft, 2002; Ayatollah & Venkatesan, 2009) in USA and India which reported significant relationships between mathematics anxiety and mathematics performance but detected no significant relationship with academic hardness of mathematics related courses. Adamu (2013) in a study done in Nigeria also reported on the contrary a non-significant correlation between mathematics anxiety and mathematics related course performance and choice, indicating a very weak relationship between mathematics anxiety and students' performance in mathematics related courses.

Majority of the respondents at 54.2% cumulatively disagreed with the statement that they felt confident when taking a mathematics related course, while only 23.2% indicated otherwise. Only 22.7% remained neutral on this statement. In fact, over half of the respondents at 59.6% strongly agreed that they worried that they might not be able to understand the mathematics in an engineering class. Only 8.3% disputed the statement, while 15.2% remained neutral. Majority of the respondents at 63.5%, 55.2% and 61.3% respectively disagreed with the statements that they believed they could do mathematics very well in a mathematics related course, think like a mathematician and would be confident when using mathematics outside of school. These results revealed a high level of anxiety towards mathematics related courses since the students believed they could not do well in a mathematics related course and they would not be confident when using mathematics outside school. The results further reveal that students who view mathematics as a difficult and boring subject tend to avoid mathematics whenever or wherever possible leading to avoidance of mathematics related courses. The results concur with Espino, Pereda, Recon, Perculeza & Umali (2017) in Philippines which revealed that there is a significant relationship between mathematics anxiety and the course and career choice. Because of mathematics anxiety, most of the respondents tend to choose Humanities and Social Sciences (HUMSS) as their study track. The results were also in accord with (Ashcraft & Ridley, 2015; Garry, 2005) in USA that, mathematics anxious individuals may avoid any mathematics courses or subjects involving mathematics.

Correspondingly, during the interview session with the deans of students, it was also found that mathematics anxiety was pronounced among the female students, especially those who took mathematics related courses and were not well conversant with the mathematics concepts. For instance, one of the Deans of students expressed that:

Many students who suffer from mathematics anxiety have little confidence in their ability to do mathematics and tend to take the minimum number of required mathematics courses, greatly limiting their career choice options. This is unfortunate, especially as our society becomes more reliant on mathematical literacy (DS2).

DS2 expressed that mathematics has been viewed as a tough subject due to factors like anxiety this has resulted to poor performance in Mathematics subject and also has discouraged the students from taking mathematics related courses in institutions of higher learning. These findings also concur with that of Ashcraft & Ridley (2015) which found that in academic settings, mathematics anxiety affects an individual in any school related activities, in classrooms and standardized test taking. (Ashcraft & Ridley, 2015; Garry, 2005) further found that, mathematics anxious individuals may avoid any mathematics courses or subjects involving mathematics. Similarly, a study by Hembree (2010) in Australia found that mathematics anxious individuals do not gain competence or mastery of mathematical operations and it may directly influence their performance in mathematics and choice of mathematics related careers. However, these findings contradict Adamu (2013) in Nigeria which observed a weak negative correlation between mathematics anxiety and mathematics related course performance and choice, indicating a very weak relationship between mathematics anxiety and students' performance in mathematics related courses. This contradicts the hypothesis that there is a significant relationship between anxiety and mathematics related course choice among the students. Adamu (2013) is also opposed to the findings that reported a significant relationship between anxiety and mathematics related course performance (Ashcraft & Kirk, 2001; Ayatollah & Venkatesan, 2009).

Testing of the Null Hypothesis

H₀₁: *There is no statistically significant relationship between anxiety and the choice of mathematics related courses among female students in TTIs.*

To establish whether there was any significant relationship between anxiety and the choice of mathematics related courses among female students, a Pearson Correlation analysis was conducted between the two variables. Since data for anxiety and the choice of mathematics related courses among female students were measured on ordinal Likert level for each item, it was important to obtain continuous data to facilitate performance of correlation analysis. Thus, summated scores for each respondent were obtained for each of the two scales. The corresponding scores for each respondent were used as data points for the 277 participants (female students).

The null hypotheses were to be tested at 0.05 significance/alpha level (α). The test statistic is converted to a conditional probability called a *p*- value. If $p \leq \alpha$, the null hypothesis is rejected, meaning that the observed difference is significant, that is, not due to chance. However, if the *p*- value will be greater than 0.05(i.e., $p > \alpha$), the null hypothesis will not be rejected (we fail to reject the null hypothesis), meaning the observed difference between the variables is not significant. The correlation output is presented in Table 4.4

Table 4.2: Correlation output for anxiety among female students and choice of mathematics related courses

		Anxiety among female students	Selection of mathematics related courses
Anxiety among female students	Pearson Correlation	1	-.675**
	Sig. (2-tailed)		.000
	N	277	277
Selection of mathematics related courses	Pearson Correlation	-.675**	1
	Sig. (2-tailed)	.000	
	N	277	277

** . Correlation is significant at the 0.05 level (2-tailed).

The findings in Table 4.2 show that there is a strong negative relationship ($r = .675$) between anxiety among female students and the choice of mathematics related courses which was statistically significant ($p < 0.05$). Since the significance (*p* value) of Levene's test (0.003) is less than α level (0 .05) then we reject the null hypothesis that the variances of the two groups are equal, implying that the variances are not equal. The findings show that *p*- value is less than the significance level (0.05). That is, $0.00 < 0.05$. We therefore reject the null hypothesis, and the alternative hypotheses accepted. This implies that statistically the more mathematic anxious the female students would be, the less likely they would choose mathematics related courses. These results contradict (Kyande, 1986; Smith & Dengiz, 2010; Tully & Jacobs, 2010) which found that students who have high mathematical abilities are more likely to pursue a mathematics related course. However, these results concur with (Ashcraft, 2011; Ashcraft & Ridley, 2015; Garry, 2005; Hembree, 2010; Lee, 2016) which reported a significant relationship between mathematics anxiety and mathematics career choice that students with high mathematics anxiety are likely not to select a mathematics related course.

Regression Output for anxiety among female students and choice of mathematics related courses

To determine the relationship between anxiety among female students and choice of mathematics related courses, regression analysis was conducted between the variables. Data collected was converted to continuous data by summing the individual item scores in the scale for each respondent. Data obtained from the 277 respondents effectively provided 277 data points. The regression output is presented in Table 4.3.

Table 4.3: Regression output for anxiety among female students and choice of mathematics related courses

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.682 ^a	.465	.450	1.849		
ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	109.9	1	109.9	232.153	.000 ^b
	Residual	126.5	276	3.418		
	Total	236.4	277			
Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	34.83	2.960		11.77	.000
	Anxiety among female students	-.694	.122	-.682	-5.670	.000

a. Dependent Variable: choice of mathematics related courses

b. Predictors: (Constant), anxiety among female students

The study found that anxiety among female students explain up to 45.0% (Adjusted R square = .450) of variance in the choice of mathematics related courses. The model was found to be statistically significant as $F(1, 276) = 232.153$ [$p < .05$]. This shows that from regression, anxiety among female students is able to account for 45.0% of variance in the choice of mathematics related courses.

The variables were modeled to be connected by the linear regression equation in the form:

$$Y = B_0 + B_1X_1 + \epsilon$$

Where Y is choice of mathematics related courses, B_0 is Coefficient of constant term, B_1 is coefficient of anxiety among female students, X_1 is anxiety among female students and ϵ is error term. Thus, replacing the coefficients of regression, the equation becomes;

$$Y = 34.83 - 0.694X_2$$

This shows that, when anxiety among female students change by one positive unit, choice of mathematics related courses declines by 0.694. Thus, anxiety among female students negatively affects choice of mathematics related courses to a magnitude of 0.694 as indicated by the main effects.

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of findings on relationship between anxiety and choice of mathematics related courses among female students in TTI

The first study objective sought to investigate the relationship between anxiety and choice of mathematics related courses among female students in Technical Training Institutes. The study found that majority of the respondents strongly agreed with the statement that they got tensed whenever they heard of mathematics related course. Over two thirds of the respondents cumulatively supported the statement that they got nervous whenever they had to do mathematics course. While majority of the respondents at over half strongly supported the statement that they worried that they would not apply mathematics in their future career. Almost three quarters of the respondents also cumulatively confirmed that they got concerned that they would not be able to get good grade in mathematics related course if they had to it. These findings implied that although these female students took up mathematics related courses because they might have performed well in secondary schools, they were losing mathematics interest and would not be able to perform well at the long run.

The study also found that more than half of the respondents strongly agreed with the statement that they felt stressed when listening to a mathematics teacher in class. In fact, two thirds of the respondents revealed that they got worried over their limited knowledge in mathematics to perform well in mathematics related courses. Over three quarters of the respondents supported the statement that working on mathematics homework was stressful to them. Another majority worried that they would not be able to complete every assignment in mathematics course. This shows that inability to tackle mathematics problem and finish up every mathematics assignment in mathematics related courses was due to high level of mathematics anxiety among the students.

In fact, others disputed that they would be able to perform well in mathematics. While majority of the respondents cumulatively disagreed with the statement that they felt confident when taking a mathematics related course. In fact, over half of the respondents strongly agreed that they worried that they might not be able to understand the mathematics in an engineering class. Majority of the respondents disagreed with the statements that they believed they could do mathematics very well in a mathematics related course, think like a mathematician and would be confident when using mathematics outside of school.

The finding shows a strong negative relationship ($r = -0.675$) between anxiety among female students and the choice of mathematics related courses which was statistically significant. This implies that statistically the more mathematics anxious the female students would be, the less likely they would choose mathematics related courses.

During the interviews one of the female students taking mathematics related courses confessed that she gets tensed whenever she hears of mathematics. While the other one indicated that she invests less time and effort in learning, organize her learning environment less efficiently and devote less concentration and attention to a learning session. In fact, one female student not taking mathematics related courses echoed that she would panic during mathematics exams or lesson. Another female student indicated that she would freeze up on some important tests and while taking the tests she felt much tensed and uneasy. During an interview with deans, one of them found that mathematics anxiety was pronounced among female students, especially those who took mathematics related courses and were not well conversant with mathematics concepts. These findings generally indicated that mathematics has been viewed as a tough subject due to factors like anxiety, this has resulted to poor performance in mathematics subjects and has also discouraged female students from taking mathematics related courses in institutions of higher learning.

5.2 Conclusion on relationship between anxiety and choice of mathematics related courses among female students in TTI

The study concluded that there is a strong negative relationship between anxiety among female students and the choice of mathematics related courses which was statistically significant. This implies that statistically the more mathematics anxious the female students would be, the less likely they would choose mathematics related courses.

5.3 Recommendations on relationship between anxiety and choice of mathematics related courses among female students in TTI

The study recommends that mathematics teachers should teach students' study habits, raise student's confidence in their mathematical abilities and provide more practical tasks during mathematics class. Mathematics teachers should also be trained to address anxiety problems of individual student. These interventions would help the students in making informed choices when taking up mathematics related courses. This is because the study found a strong negative relationship between anxiety among female students and the choice of mathematics related courses which was statistically significant

5.4 Concerns for further research

Suggestions for further Research

The study identified three gaps which the researcher recommends for further review by other scholars.

- i. A study on demographic factors influencing selection of mathematical related courses can also be researched
- ii. A study on the influence of personality traits of the student and career selection can be carried out by future scholars.
- iii. A similar study can be done in other parts of the country for easier comparison.

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