The Influence of Students' Perceptions on Business Mathematics Performance: A Case of the College of Business Education in Mwanza, Tanzania

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Ikisiri

Tafiti hii imejikita katika kutathmini mambo yanayochochea wanafunzi wa elimu ya juu katika mitazamo yao na ufaulu wao katika somo la hisabati za kibiashara katika Chuo cha Elimu ya Biashara (CBE) - Kampasi ya Mwanza. Madhumuni mahsusi yalikuwa mawili.Moja, kuangalia kama jinsia inaathirimitazamo ya wanafunzi wa Chuo cha Elimu ya Biashara katika somo la hisabati za kibiashara. Pili, kutazama mahusiano kati ya mitazamo sita ambayo ni hadithi na imani, motisha katika usomaji wa somo la hisabati, kujiamini kwa mwanafunzi, msaada kutoka katika familia, mvuto katika usomaji wa hisabati na mazingira ya kujifunzia na ufundishaji na ufaulu wa wanafunzi katika somo la hisabati za kibiashara. Takrimu zilichakatwa na kuchambuliwa kupitia program ya IBM SPSS kupitia uwiano (correlation) na rejeshi la mstari (linear regression). Matokeo ya utafiti yanaonesha kwamba jinsia haina mchango wowote katika ufaulu wa wanafunzi wa CBE katika somo la hisabati za kibiashara. Mitazamo sita yote ilikuwa na athari chanya na umuhimu katika ufaulu wa somo la hisabati za kibiashara. Tafiti hii inashauri manejimenti ya Chuo cha Elimu ya Biashara kuwekeza katika kuweka mazingira bora zaidi na wezeshi kwa wanafunzi ili kukabiliana na mitazamo hasi juu ya somo hili kwa manufaa mapana zaidi kwa wanafunzi na Taasisi kwa ujumla

Abstract

This study focused on assessing the factors influencing Higher learning students' perceptions on business mathematics performance focusing on the College of Business Education (CBE) Mwanza campus. The specific objectives were to examine the effect of gender on the way College students perceive Business mathematics and how these perceptions influence their performance and the second objective was to examine the relationship between six perception constructs and student's performance in business Mathematics namely motivation, myths and beliefs, self confidence, family background and support, interest and teaching and learning materials used in business mathematics. Data were analyzed through correlation and regression analysis and the results revealed that all the six perception constructs had a positive and significant relationship with student's performance in business mathematics. The study concludes that the six perceptions constructs had a positive and significant effect on student's performance in business mathematics. The study recommends that both the management and the students at the CBE should work together in making sure that these perceptions are addressed fully for better performance of the institution and the students at large

Key words: Perceptions, performance, business mathematics, CBE, Tanzania

1. INTRODUCTION

The world today looks at mathematics as an engine for the development of all scientific disciplines indirectly used in all facets of life. Mathematical knowledge plays a crucial role in understanding the contents of other subjects such as science, social studies and even music and art(Anthony & Walshaw, 2009; Sarma& Ahmed, 2013). Mathematics knowledge equips students with skills to analyse and change the world. This can be achieved through the learners as their mental faculty is stimulated to solve problems, discover the best possible solutions and enables learners to think independently in applied and abstract ways which in turn assists in solving problems and assess various risks(Agommuoh & Ifeanacho, 2013; Ward-Penny, 2010). Abe and Gbenro (2014) pointed out that mathematics plays a multidimensional role in science and technology and its application surpasses all areas of science, technology as well as business enterprises.

Mathematical thinking is essential to national prosperity in providing tools for understanding science, engineering, technology and economics, thus, mathematical thinking is very crucial in public decision making and for participation in the knowledge economy. The phrase "perception of mathematics" in this study signifies the mental representation of mathematics originating from past experience as well as associated beliefs, attitude and conceptions. Students' perception on a given subject determines their success or failure in that particular subject. Some students perceive mathematics as a no go area because of the negative impression passed down to them by past generations who had negative experiences with unqualified tutors who made them believe mathematics is the most difficult subject and not a cup of coffee for everyone(Dauda, Jambo & Umar, 2016; Mutodi &Ngirande, 2014; Shavinina, 2013). Perceptions towards mathematics are vital towards effective facilitation of learning and teaching the discipline. This concept influences the instruction of mathematics both positively and negatively. The school system, family background and student's attitudes towards the school altogether have an effect on the way students view mathematics. Pontian (2019), further stressed that student's positive discernment towards mathematics at a young age would present the opportunity for many students to perform well in mathematics while at a higher level of education.

Previous studies have shown that a large number of students struggle to understand mathematics as a subject and this leads to poor performance(Galadima& Yusha'u, 2020; Mazana, Montero, & Casmir, 2020). Students who fail in mathematics face difficulties in passing other related courses in tertiary levels particularly science, engineering and other business-related courses. Despite the efforts and dedication by the academic staff at the College of Business Education in assisting students in mathematics the pass rate for this particular module is far from being satisfactory. Thus this study looked into the perceptions that influence the performance of students in business mathematics.

The concept of academic performance is believed to possess an amorphous nature since it broadly incorporates various factors ranging from attaining a professional degree to the development of students in the moral sense. Student performance can best be understood as the quantifiable and apparent behavior of a student within a definite period and in an aggregate of scores fetched by a scholar in various evaluations through class tests, mid and

end semester examinations (Kumar, 2021; York, Gibson& Rankin, 2015). In tjis stdy, students performance in business mathematics was operationally defined as the semester exams score results for students from Diploma I, Diploma II, Bachelor, I, II and III at the College of Business Education Mwanza Campus.

Various studies have shown that individuals with high levels of self-confidence in mathematics tend to perform better academically(Egorova & Chertkova, 2016; Feldman & Kubota, 2015; Honicke & Broadbent, 2016). Self confidence in Mathematics is one among the most important psychological structures and is the subject of much of the existing research on students' mathematical achievement. Students who possess high self confidence in mathematics tend to believe in their own abilities that they can be successful in learning and eventually passing the subjects as their confidence helps them to overcome the fear of failing. These students dare to take mathematical challenges which in turn increase their academic achievement. On the contrary, students with low self-confidence tend not to believe in themselves and in turn avoid taking up mathematical challenges and by so doing their academic performance is affected negatively (Adelson& McCoach, 2011; Hosein& Harle, 2018; Van der Bergh, 2013). Çiftçi and Yıldız (2019)argued that with respect to mathematics education research has shown that students' self confidence in mathematics skills and in learning process is an important predictor of mathematics achievement as the success or failure by the latter is highly influenced to a greater extent by their self confidence in mathematics. The general objective of this study was to study the influence of student's perceptions on business mathematics performance and the specific objectives were to examine whether gender, has an effect on the way college students perceive mathematics and how these perceptions influence performance and the second specific objective was to examine the relationship between six perception constructs and students' performance in Business mathematics at CBE.

Thus, based on the literature discussed above this study is guided by the following hypothesis;

H1. There is a positive relationship between self confidence and student performance in Business mathematics

Family background affects student's learning behaviors and academic achievement. Family background is important as it is the primary and most influential environment that students are mostly exposed to. Academic achievement in various subjects or courses is a continuous process that requires a close guide from the family members to the students. (Li, Z & Qiu, 2018). Thus, family background plays a pivotal role in influencing student's performance in mathematics. According to Smith (2004) he pointed out that students' cultural backgrounds differ and can affect students' influence to study mathematics. Smiths (2004) further contended that students from different cultural backgrounds are influenced differently based upon parental experiences, interests in mathematics and cultural views and attitudes towards mathematics.

Thus, based on the literature discussed above this study is guided by the following hypothesis;

H2. There is a positive relationship between family background and support and student performance in business mathematics

Academic self-determined motivation in mathematics has been found to play a substantial role with regard to mathematical achievement, learning enjoyment, self-concept and self regulation. Students who are highly motivated to study mathematics achieve significantly higher test scores, enjoy learning more and have more positive outcomes compared to less motivated students. Studies have revealed that there is a positive relationship though modest between student motivation and academic performance (Gottfried*et al*, 2013; Pekrun, 2014). Empirical studies have shown that there is a positive relationship though modest between student motivation and academic performance (Morony *et al*., 2013).

Thus, based on the literature discussed above this study is guided by the following hypothesis;

H3. There is a positive relationship between motivation and student performance in business mathematics

Student's beliefs about mathematics are highly influenced by the past experience that the students has with the subject. However, changing such beliefs might be a task not easily to

be accomplished by the instructors, educational policy makers and even parents. Many people hold the view that mathematics is only for the clever ones or only for those who have inherited mathematics ability from their parents. Another widely held belief is that mathematics is a male dominant subject and boys are better in mathematics than girls (Ali, 2013; Vandecandelaere*et al*, 2012).

Thus, based on the literature discussed above this study is guided by the following hypothesis;

H4. There is a positive relationship between myths and beliefs and student performance in business mathematics

Interest in mathematics plays a vital role in mathematics learning. Basically, interest in mathematics represents a psychological state of engaging or having the tendency to reengage in a particular content in the course of time. Studies have proven that students who develop interest in mathematics have a bigger chance of understanding the subject. This will eventually facilitate the whole process of learning and in turn chances are higher for these students to pass the subject concerned (Heinze, Reiss, & Franziska, 2005; Hidi & Renninger, 2006; Yu & Singh, 2016).

Thus, based on the literature discussed above this study is guided by the following hypothesis;

H5. There is a positive relationship between interest in business mathematics and student performance

Teaching/learning materials support help tutors to teach conveniently and the learners to learn more easily without any problem of understanding. Instructional materials are very significant in the whole process of learning as the availability of the latter broaden the concepts being taught and arouse students' interest in the subject being taught (Kochhar, 2012; Olumorin *et al*, 2010)

Thus, based on the literature discussed above this study is guided by the following hypothesis;

H6. There is a positive relationship between teaching/learning material support and student performance in business mathematics

Based on the literature review the conceptual framework for this study can be described as follows.

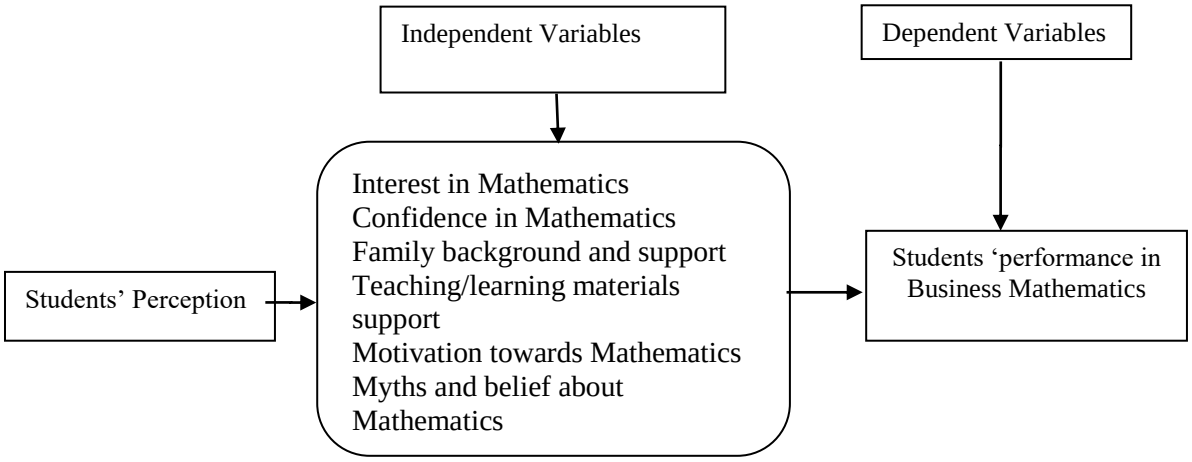

Figure 1: Conceptual framework

2. METHODOLOGY

The study was conducted at the College of Business Education- Mwanza Campus. The reason behind the choice of this college was due to the fact that the latter is one among the first public colleges rendering business oriented courses in the Lake Zone region under the Ministry of Industry and Trade. With more than 14 years since its establishement CBE-Mwanza Campus was purposively chosen for this particular study. The population for this study was all diploma1, diploma 2, bachelor 1, bachelor 2 and bachelor 3 students of the College of Business Education- Mwanza Campus. The eligibility criteria for the choice of this population was all students who have been at the College for a period of at least one year and have sat for the end of semester exam in business mathematics module. Thus, student's end of semester results in the academic year 2019/2020 were used as a measure of student's performance. The total population size was 336 students. Considering the RaoSoft sample calculator a minimum recommended sample size of 180 students was obtained. The respondents were selected by applying simple random sampling method. The study applied

quantitative research approach. The researcher chose this approach because quantitative research design permits the researcher to answer questions about the relationships between measured variables with the purpose of explaining, predicting and controlling certain phenomena.

Primary data were collected through a 30-item self administered questionnaire divided into six (6) constructs of perceptions of students' performance in business mathematics and a 5-point likert scale was designed by the researchers. Responses were based on the following labels: 1 = strongly disagree, 2= disagree, 3= Neutral, 4= agree and 5= strongly agree. Likert-type scales have been widely used by many researchers especially in measuring of attitudes and perception (Mashenene, 2016; Mbise, 2015). Before embarking on a collection of data a pre- test questionnaire was administered to 50 students who were exclueded from this study. This was done to ensure validity of the questionnaires used. The amendments were identified after pre-test and adjustment were made to improve some questions, making it fully understandable to the participants. The returned questionnaires were examined to check their level of acceptability. They were then coded and a statistical package, Statistics Package for Social Sciences (SPSS) version 20.0, was used to analyze the data. A test of reliability was done using Cronbach Alpha and the results were above 0.60. Correlation analysis was done to establish the strength and direction of the relationship between independent variables and the dependent variable and the regression analysis was done to establish the cause and effect relationship.

3.0. RESULTS AND DISCUSSIONS

3.1. Respondents' profile

The data were collected from 180 respondents. Table 1 shows the demographic profile of the study sample. The respondents' profile shows that 53.9% were females and 46.1% were male. In the aspect of age, the majority were respondents between 21 and 25 years.

Table 1: Demographic profile of respodents

Variable	Frequency	Percentage
Gender		
Female	97	53.9
Male	83	46.1
Age group		
16 – 20 years	22	12.2
21 – 25	111	61.7
26 and above	47	26.1

3.2. Reliability Test (Internal consistency)

Reliability means the data collection techniques and analytic procedure will produce consistent findings if they will be replicated by different researchers. Reliability is defined as the measure of degree to which a research instrument yields consistent results of data after repeated trials (Msabila & Nalaila, 2013; Saunders, Lewis & Thornhill, 2012). In this study the calculated Cronbach's alpha values ranged from 0.631-0.893 exceeding the minimum acceptable alpha values of 0.60. Table 3 shows the Alpha values of all the independent variables.

Table 2: Reliability Test

Description	Cronbach's Alpha	Number of items
Business mathematics performance (BMP)	0.672	5
Interest in mathematics (IM)	0.631	5
Self confidence (SC)	0.840	5
Myths and beliefs about mathematics (MBM)	0.657	5
Family background and support (FBG)	0.893	5
Teacher/learning material support (LMS)	0.743	5
Motivation towards mathematics (MTM)	0.817	5

3.3. Gender and performance mean differences

An independent-samples t-test was carried out to check whether there was a significant difference between the way mathematics' performance perceived between males and

females. It must be recalled that the null hypothesis showed no significant difference between the way mathematics' performance is perceived between males and females. The results for the test are shown in table 3 (df = 177, t = 0.015, p=0.988). The null hypothesis is not rejected since the p-value is greater than 0.05. Therefore, we conclude that there is no significant difference in the way mathematics' performance is perceived between males and females. Thus gender has no influence on how male or female perceive mathematics performance.

Table 3: Gender and performance t-test results

		t-test for Equality of Means						
		t	Df	Sig (2-tailed)	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Performance	Equal variances assumed	.015	177	.988	.00184	.12556	.24595	.24962
	Equal variances not assumed	.014	155.942	.989	.00184	.12772	.25045	.25412

3.4. Correlation Analysis

In this section the study aimed at determining the strength and direction of the relationship between independent variables and the dependent variable. Students performance in business mathematics (SPM) as dependent variable, interest in Business mathematics (IM), confidence in business mathematics (CIM), family background and support (FBS), teaching and learning material support (LMS), motivation towards business mathematics (MTM) and myths and beliefs about business mathematics (MBM) were the independent variables. The correlation matrix in Table 4 shows that student mathematics performance had a positive correlation with all the six perception constructs namely interest in business mathematics

(r=0.886), confidence in mathematics (r=0.973), family background and support (r=0.701), learning material support (r=0.767), motivation towards business mathematics (r=0.772) and finally myths and beliefs about business mathematics (r=0.643). These results revealed that there is a strong positive correlation between all the independent variables and student performance in mathematics. This is to say that these perceptions constructs have a positive significant relationship to the dependent variable.

Table 4: Correlation between independent and dependent variables

Correlations							
Variables	SMP	IM	CM	FBS	LMS	MTM	MBM
SPM	1		.		.		
IM	.886**	1					
CM	.973**	.954**	1				
FBS	.701**	.833**	.822**	1			
LMS	.767**	.854**	.917**	.841**	1		
MTM	.772**	.990**	.896**	.980**	.931**	1	
MBM	.643	.683	.500	.632	.503	.660	1

***. Correlation is significant at the 0.01 level (2-tailed).*

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

3.5. Factors affecting student's performance in business mathematics

The study conducted a linear regression analysis so as to determine the relationship between dependent variable (student performance in business mathematics) and independent variables namely motivation, myths and beliefs, self confidence, family background and support, interest and teaching and learning materials used in Business mathematics.

The regression equation was

$$SPM = \beta_0 + \beta_1 IM + \beta_2 CM + \beta_3 FBS + \beta_4 LMS + \beta_5 MTM + \beta_6 MBM + \varepsilon_{it} \quad \text{.....Eqn 1}$$

β_0 is a constant term; $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, $\beta 5$, $\beta 6$ are the coefficients of the determinants of student performance in business mathematics and $\varepsilon$is the error term.

Table 5 reveals that the value of adjusted R-square .736 which implies that 73.6% of variations of the dependent variable (student performance in business mathematics) was due to the independent variables (motivation, myths and beliefs, self-confidence, family background and support, interest and teaching and learning materials). The coefficient of determination (R-square) was .745 which is 74.5% impying that independent variables explain 74.5% changes in student performance in business mathematics. The coefficient of correlation (R) of the model was found to be .863 which implies that there is a strong positive relationship between the independent variables and the dependent variable.

Table 5: Factors for students' performance in business mathemiatics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.560	1.361		7.027	.000
	motivation	.346	.107	.364	3.243	.002
	Myths and beliefs.	.409	.109	.411	3.741	.000
	self-confidence	.712	.094	.673	7.568	.000
	family background and support	.504	.089	.537	5.287	.000
	interest	.523	.095	.552	5.503	.000
	teaching and learning materials	.496	.060	.164	1.079	.001
a.	R-square = 0.745; Adjusted R-square = 0.736					

Regression results in Table 5 show that, students who are highly interested in business mathematics are likely to perform well in the subject concerned as interest in the subject influences a student to learn and in turn affects his or her performance. This was in line to studies done by (Heinze, Reiss, & Franziska, 2005; Hidi & Renninger, 2006; Yu & Singh, 2016). Family background and support is a strong pillar in a student academic success. A family that supports affects the student's learning behaviors and academic achievement. The more support a student receives from his or her close family members the highly are the chances that his or her performance in Business Mathematics will be great. Statistical results reveal that there is a positive significant relationship between family background and support and student performance in Business mathematics (r=0.701, p-value=.000). This was in line to a study conducted by (Li, Z & Qiu, 2018).

Motivation towards business mathematics plays a vital role in student's performance in business mathematics. The students who are highly motivated to study Business Mathematics stand a better chance of attaining higher test scores as compared to less motivated students pursuing the same subject. This is mainly because high motivated students enjoy learning more and have more positive outcomes compared to less motivated students. This was supported by the studies conducted byGottfried *et al*, (2013) and Pekrun (2014). It is also good to note that students with self confidence in business mathematics tend to believe in their own abilities and that they can excel in their studies. Their confidence helps them to overcome their own fear of failing and this is a necessary prerequisite for success. These results were supported by studies conducted by (Egorova & Chertkova, 2016; Feldman & Kubota, 2015; Honicke & Broadbent, 2016).

Student's belief about business mathematics can influence his/her performance positively or negatively and in most cases these believes are the output of student's past experience with the subject. These results were in line withthe studies performed byAli, (2013) and Vandecandelaere*et al*, (2012). Teaching /learning material support assist tutors to teach conveniently and the students learn more easily without problem of understanding and thus their performance will be positively affected. Empirical results reveal that there is a positive significant relationship between teaching/learning material support and student performance in business mathematics (r=0.767, p-value=.000). These findings are in line with the studies conducted by Kochhar (2012) and Olumorin *et al*, (2010).

5. CONCLUSION AND RECOMMENDATIONS

The study concludes that the six perceptions constructs investigated all had a positive and significant effect on student's performance in Business mathematics at the College of Business Education- Mwanza campus and gender had no effect on the way college students perceive mathematics. If these constructs are carefully checked then it is a possibility that student's performance in Business mathematics will change for the better.

It is recommended that, the management of the College of Business Education should invest more efforts in creating a more conducive learning environment for students and these

perceptions should be addressed through seminars and counseling to students as this will in the end change the latter perception towards the subject.

Students and especially female students should not shy away from bad beliefs that mathematics is a male dominated subject. Studies have shown that gender has nothing to do with the performance of students In Business mathematics. So wrong beliefs should be left aside.

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