PAPER DETAILS

TITLE: KHALIFA UNIVERSITY OF SCIENCE, TECHNOLOGY AND RESEARCH (KUSTAR) STUDENTS' ATTITUDES TOWARDS MATHEMATICS IN THE LIGHT OF VARIABLES SUCH AS GENDER, NATIONALITY, MATHEMATICS SCORES AND THE COURSE THEY ARE ATTENDING

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KHALİFA UNİVERSİTY OF SCİENCE, TECHNOLOGY AND RESEARCH (KUSTAR) STUDENTS' ATTİTUDES TOWARDS MATHEMATİCS İN THE LİGHT OF VARİABLES SUCH AS GENDER, NATİONALİTY, MATHEMATİCS SCORES AND THE COURSE THEY ARE ATTENDİNG

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ABSTRACT: This study was aimed at identifying the attitudes of the students of Khalifa University towards mathematics .The sample of this study consisted of 88(out of 216) students distributed evenly according to gender. 56.9% of the sample were Emiraties and 53.1% were expatriates. The Attitude Towards Mathematics Inventory (ATMI) was implemented in collecting the data.
The results of this study indicated that there were slight statistically significant differences between students' attitudes towards mathematics and mathematics achievement scores, age, the course they are attending, students' high school type, gender and their academic level. Additionally, the results indicated that there were statistically significant differences between self-confidence, enjoyment and value with and students' nationalities. Expatriates students showed higher positive attitudes towards mathematics than the Emirati students. Also, the results showed that there was a slight statistical relationship between enjoyment and students' academic level. Finally, this study revealed that 62.67% of the sample have self-confidence in dealing with mathematics, 84.4% felt that mathematics has a great value to them, and 75.49% showed enjoyment in dealing with mathematics.

Keywords: Attitudes, mathematics, gender, nationality, course attending

INTRODUCTION

Researches on students' attitudes toward mathematics have acquired increasing attention. Many studies outlined that mathematics learning is influenced by several factors; such as motivation, curriculum, teacher and his way of teaching and educational teaching aids he used (Cote & Levine, 2000; Singh et al., 2002; Olatunde, 2009; Howie, 2005; Singh, et al., 2002). Hill (2004) indicated that integrating mathematics and science curriculum does improve students' attitude toward mathematics. Yet, regardless of the amount of effort spend in the improvement and development of mathematics learning process, efforts will have a slight impact in achievement unless there is a positive attitude towards mathematics. (Ma & Kishor, 1997; Ma, & Xu, 2004). However, many factors have influences on students' attitudes toward mathematics. Teachers, parents, and peers, as well as the school environment, all have influences on an individual's attitude. Wilkins and MA (2003) showed that teachers', peers', and parents' positive support will help in creating positive attitude and beliefs about mathematics and thus help restrain negative attitudes and beliefs. Whereas Ames (1992) considered student's home environment and access to instructional materials can all have an impact on his attitude and achievement.

Purpose of the Study

The general purpose of this study was to find out the attitudes of the students of Khalifa University of Science Research and Technology (KUSTAR) towards mathematics. The study is focused on the relationship of their attitudes towards mathematics with other factors such as; gender, mathematics scores, high school type, nationality, academic level, age and the mathematics course they are attending.

Research Questions

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- Selection and peer-review under responsibility of the Organizing Committee of the conference

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This study aimed to answer the following questions:

1. What is the prelateship between students' attitudes towards mathematics and academic achievement?
2. What is the relationship between students' attitudes towards mathematics and gender?
3. What is the relationship between students' attitudes towards mathematics and nationalities?
4. What is the relationship between attitudes towards mathematics and academic level (foundation or freshmen year)?
5. What is the relationship between attitudes towards mathematics and age?
6. What is the relationship between attitudes towards mathematics and mathematics courses they are attending?
7. What is the relationship between attitudes towards mathematics and high school type?

Definition of Terms

The following definitions are provided for terms having special applications to this study.

1. Attitude – "refers to someone's basic liking or disliking of familiar target" (Hannula, 2002; p.25)
2. High School Type: The high school type refers to either private or government school.
3. Academic Level: The academic level refers to whether the student is in foundation or freshman year.
4. Nationality: The nationality refers to whether the student is an Emirati or an Expatriate.

Literature review

Many studies have studied the students' attitudes towards mathematics and the impact of that on their achievement. Gottfried (1985) reported in his study that students who value and enjoy mathematics have a higher level of achievement. As well as, Ma and Xu (2004) showed in their study that poor achievement has been linked to a decline in mathematics attitude. Therefore, achievement in mathematics caused a positive attitude. However, a positive attitude towards mathematics does not lead to a good achievement. Other factors might affect students' achievement in mathematics such as textbooks, and teacher quality (Howie, 2005). Yet, both Tapia and Marsh II (2004) argue that students who do well in mathematics showed positive attitudes, consequently they are likely to take more mathematics courses. So, attitude and achievement affect each other in a cyclical manner (Schiefele & Csikszentmihalyi, 2004). Whereas, Ma and Kishor (1997) concluded that the relationship between attitudes towards mathematics and mathematics achievement is not a strong enough. Therfore, Phonguttha, et al. (2009) agreed with Ma and Kishor that mathematics achievement and attitude towards mathematics are not correlated. Furthermore, Casey et al. (1997) and Ma (1999) showed that the relationship between attitude and mathematics achievement exists only with respect to specific or particular mathematics content areas. Maple and Stage (1991) indicated that students' attitude towards mathematics could be used as a predictor of selecting a mathematics major but not for achievement. Along with that, Oakes (1990) argued that students with lower levels of achievement in mathematics confine students' career alternatives involving mathematical skills.

We do know that students' attitudes towards mathematics change overtime because it could be replaced by other activities. Students in the early stages of schooling are given the mathematical concepts slowly and repeatedly by using different teaching aids, resulting in positive attitudes and high achievement for the majority of students. As the mathematical subjects gets more abstract and more diverse, students' attitudes and achievement started to decline or decrease (Ma & Kishor, 1997; Hannula, 2002; Sanchez et al., 2004). The decline in students' attitude towards mathematics could be justified by the huge number of alternatives available for today's students.

Other studies outlined that students' achievement in mathematics is influenced by a variety of factors other than students' attitudes towards mathematics, such as gender, teacher's experience, parents, socioeconomic status, ethnicity, cultural background, grade level and peers (Casey et al, 1997; Ho, et al., 2000; Ma & Kishor, 1997; Ma, 1999, 1997; Carrier, 2008; Isiksal, 2008). Moreover, other researchers outlined that students' attitudes towards mathematics can be affected by teacher attitudes and beliefs (Uusimaki & Nason, 2004; Beswick, 2006; Wilkins & Brand, 2004; Swan, Bell, et al., 2000; Schoenfeld, 1985; Beswick, 2007). Along with that, teaching techniques were considered by many researchers as other factors that could affect students' attitudes toward mathematics (Anderson, 2005; Townsend et. al., 1998; Higgins, 1997; Pearce et. al., 1999; Mitchell, 1999; Kinney, 2001; Yusof & Tall, 1998; Elliott et. al., 2001; Raymond & Leinenbach, 2000; Whitin, 2007).

Furthermore, Tymms (2001) stated that the most important factors affecting students' attitudes towards mathematics were the teacher and student academic level; while gender, age and language were weakly related

with students' attitudes. Koller, et al. (2001) researched gender differences in mathematics achievement, which showed that male achievement is higher than that of female one especially in advanced mathematics courses. However, other researchers (Tapia & Molavan (2007; Tapia & Marsh II, 2004; Isiksal & Cakiroglo, 2008) showed that gender had no effect on students' attitudes towards mathematics and male and female students had the same average mathematics score. Vaughan (2002) introduces another factor that has a direct impact on students' attitudes towards mathematics. He argues that using cooperative learning in our schools will increase the interaction between students and consequently produce positive attitudes towards mathematics and academic achievement.

METHODS

This study was aimed at identifying the attitudes of the students of Khalifa University of Science, Technology and Research (KUSTAR) towards mathematics in the light of variables such as gender, nationality, mathematics scores and the course they are attending

Data Collection Instrument

In this study the Attitudes Towards Mathematics Inventory (ATMI) (Appendix A) was used to collect data about students' attitudes towards mathematics. ATMI consists of 40-items, 5-points Likert scale ranging from strongly disagree to strongly agree distributed by using exploratory factor analysis into four areas or domains related to attitudes towards mathematics including self-confidence (15 items), value(10 items), enjoyment(10 items), and motivation(5 items) as shown in table-1. The instrument has a reliability coefficient alpha of 0.97 with standard error of measurement of 5.67 (Tapia, 1996). It also demonstrates content and constructs validities.

Table 1. The distribution of the ATMI scale according to the four domains

Domain	Items	Total
Self-confidence	9,10,11,12,13,14,15,16,17,18,19,20,21,22,40	15
Value	1,2,4,5,6,7,8,35,36,39	10
Enjoyment	3,24,25,26,27,29,30,31,37,38	10
Motivation	23,28,32,33,34	5
Total		40

Sample

The sample of this study consisted of 88 out of 216 undergraduate students at Khalifa University randomly selected from all students enrolled in the pre-calculus, calculus-I, and calculus-II courses whose ages ranged from 18 to 22 years old and agreed to participate in this research. As shown in table 2, forty-four students of the sample were male and the same number was female. 58(66%) students were Emiratis and 30 (34%) students were expatriates.

Table 2. The sample distribution according to gender, age, and nationality

Gender	Nationality	Age(years)					
		18	19	20	21	22	Total
Male	UAE	1	19	12	1	0	33
	Others	3	6	1	0	1	11
	Total	4	25	13	1	1	44
Female	UAE	4	14	7	0		25
	Others	2	11	4	2		19
	Total	6	25	11	2		44
Total		10	50	24	4		88

Table 3 and figure 1 show the sample distribution according to the mathematics courses they are attending and the type of the school they obtained their high school diploma from. 67 of them obtained their high school diploma from government school and 21 were from private ones. Whereas, 24 students are in Pre-calculus, 27 students are in Calculus I and 37 students are in Calculus II.

Table 3. The sample distribution according to High school type, and Course are attending

High School Type	Course			Total
	Pre-Calculus	Calculus-I	Calculus-II	
Government	19	18	30	67
Private	5	9	7	21
Total	24	27	37	88

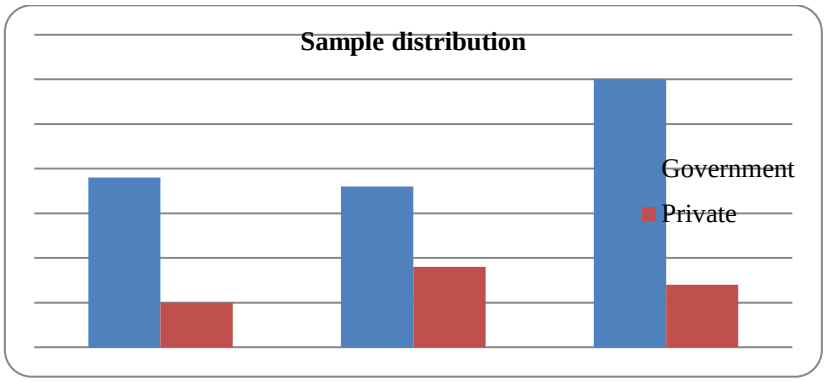

Figure 1. The sample distribution according to high school type and Course are attending

RESULTS and FINDINGS

Research Question 1

What is the prelateship between students' attitude towards mathematics and academic achievement?

In order to the answer the first research question, and by assuming that the data is normally distributed according to Kolomogrov and Shapirotests tests with $p > 0.05$, Pearson correlations were calculated. The results shown in table 4 outlined that there is a slight significant relationship between students' attitudes towards mathematics and mathematics achievement scores. However, this relation can explain 9.24% of the variance, 90.76 % unjustified or unexplained.

Table 4. Pearson correlations between students' attitudes and academic achievement

		Attitude	Math Grade
Attitude	Pearson Correlation	1	0.304*
	Sig. (2-tailed)		0.017
	N	76	61
Math Grade	Pearson Correlation	.304*	1
	Sig. (2-tailed)	0.017	
	N	61	69

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

Research Question 2

What is the relationship between students' attitude towards mathematics and gender?

In order to find out if there is statistically significant differences between students' attitudes towards mathematics and gender. By assuming the homogeneity of the two variances according to Levene's test with $p > 0.05$ as shown in table 5, and according to Kolmogorov-Smirnov and Shapiro-Wilk normality tests, we can assume that the data achieved the normality condition with $p > 0.05$ as shown in table 6. As shown in table 7 the means and standard deviations for the two groups are: 140.67, 140.70, 9.78, and 9.16 respectively. Four separate analyses of variances (ANOVA) were conducted as shown in table 8. The results indicated that no statistically significant differences between the four domains and gender with $p > 0.05$.

Table 5. The levene's test of variances homogeneity

Levene's Test for Equality of Variances			
		F	Sig.
Attitude	Equal variances assumed	0.032	0.859

Table 6. The normality test

	Kolmogorov-Smirnov			Shapiro-Wilk		
Attitude	Statistic	df	Sig.	Statistic	df	Sig.
	0.086	76	.200*	0.971	76	0.076

Table 7. The descriptive statistics according to the gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Attitude	Male	39	140.67	9.78	1.56563
	Female	37	140.7	9.16	1.50667

Table 8. The four analysis of variances(ANOVA) according to the gender

Domain		Sum of Squares	df	Mean Square	F	Sig.
Self_ Confidence	Between Groups	20.555	1	20.555	.867	.355
	Within Groups	1848.195	78	23.695		
	Total	1868.750	79			
Value	Between Groups	.705	1	.705	.030	.862
	Within Groups	1933.601	83	23.296		
	Total	1934.306	84			
Enjoyment	Between Groups	2.012	1	2.012	.076	.784
	Within Groups	2174.690	82	26.521		
	Total	2176.702	83			
Motivation	Between Groups	.440	1	.440	.079	.779
	Within Groups	460.383	83	5.547		
	Total	460.824	84			

Research Question 3

What is the relationship between students' attitudes towards mathematics and nationalities?

In order to find out if there is a statistically significant difference between students' attitudes toward mathematics and nationalities, the homogeneity of the two variances was assumed according to Levene's test with $p > 0.05$ as shown in table 9 and descriptive statistics shown in table-10. As shown previously in table-6, it can be assumed that the data is normally distributed. Four separate analyses of variances (ANOVA) were conducted as shown in table 11. The results indicated that there were statistically significant differences between self-confidence *F (1, 78)* = 9.699 and $p = 0.03$, enjoyment *F(1, 82)* = 15.285 and $p = 0.001$, and value *F (1, 83)* = 6.419 and p = 0.013, and students' nationalities at $\alpha = 0.05$. However, the results showed that there is no statistically significant difference between motivation $F(1,83) = 1.148$ and $p = 0.228$, and nationality at $\alpha = 0.05$. No Post Hoc comparisons were conducted because the number of values in each domain is less than three values. However, according to the descriptive statistics mentioned in table 10, we can conclude that the other nationalities with a mean value of 142.79 have higher positive attitudes towards mathematics than UAE students with a mean of 139.46.

Table 9. The levene's test of variances homogeneity

	Levene's Test for Equality of Variances		
		F	Sig.
Attitude	Equal variances assumed	0.393	0.532

Table 10. The descriptive statistics according to the nationalities

Nationality		N	Min.	Max.	Mean	Std. Deviation
UAE	Attitude	48				
	Valid N (leastwise)	48	108	160	139.4583	9.25745
Others	Attitude	28	117	158	142.7857	9.49213
	Valid N (leastwise)	28				

Table 11. The Four Analyses Of Variances (ANOVA) According To The Nationalities

	Domain	Sum of Squares	df	Mean Square	F	Sig.
Self_ Confidence	Between Groups	206.67	1	206.67	9.699	
	Within Groups	1662.08	78	21.309		
	Total	1868.75	79			0.003
Value	Between Groups	138.85	1	138.85	6.419	
	Within Groups	1795.456	83	21.632		
	Total	1934.306	84			0.013
Enjoyment	Between Groups	342.002	1	342.002	15.285	
	Within Groups	1834.7	82	22.374		
	Total	2176.702	83			0
Motivation	Between Groups	8.063	1	8.063	1.478	
	Within Groups	452.76	83	5.455		0.228

	Total	460.824	84

Research Question 4

What is the relationship between attitudes towards mathematics and academic level (foundation or freshmen year)?

In order to find out if there is statistically significant differences between students' attitudes towards mathematics and their academic level. The homogeneity of the two variances and the data that was normally distributed were assumed according to Levene's test with $p > 0.05$ as shown in table 12. Based on the descriptive statistics shown in table 13 and according to Kolmogorov-Smirnov and Shapiro-Wilk normality tests, four separate analyses of variances (ANOVA) were conducted as shown in table 14. The results indicated that there were no statistically significant differences between students' attitudes towards mathematics and students' academic year at $\alpha = 0.05$. However, the analysis showed that there is a slight statistically significant difference between enjoyment and student's academic level F (1, 82) = 4.198 with $p = 0.044$ favor to freshman students ($\bar{x} = 140.88$).

Table 12. The Levene's Test Of Variances Homogeneity

Levene's Test for Equality of Variances			
		F	Sig.
Attitude	Equal variances assumed	1.038	0.312

Table 13. The Descriptive Statistics According To Attitude And Academic Level

	Academic Level	N	Mean	Std. Deviation	Std. Error Mean
Attitude	Foundation	18	140.0556	7.97402	1.87949
	Freshman	58	140.8793	9.88189	1.29756

Table14. The Four Analysis Of Variances(ANOVA) According To The Academic Level And Attitude

Domain		Sum of Squares	df	Mean Square	F	Sig.
Self_ Confidence	Between Groups	88.817	1	88.817	3.892	0.052
	Within Groups	1779.933	78	22.82		
	Total	1868.75	79			
Value	Between Groups	9.287	1	9.287	0.4	0.529
	Within Groups	1925.019	83	23.193		
	Total	1934.306	84			
Enjoyment	Between Groups	106.002	1	106.002	4.198	0.044
	Within Groups	2070.7	82	25.252		
	Total	2176.702	83			
Motivation	Between Groups	1.32	1	1.32	0.238	0.627
	Within Groups	459.504	83	5.536		
	Total	460.824	84			

Research Question 5

What is the relationship between students' attitudes towards mathematics and age?

In order to answer the fifth research question, and by assuming that the data is normally distributed according to Kolomogrov and Shapirotests with p > 0.05, Pearson correlations were calculated. The results as shown in table 15 outlined that there is no meaningful relationship between students' attitudes towards mathematics and age at $\alpha = 0.05$. However, only this relationship can explain 4.7% of the variance, 95.3 % unjustified or unexplained.

Table 15. The Correlations Between Students' Attitude Towards Mathematics And Age

		Attitude	Age
Attitude	Pearson Correlation	1	-0.217
	Sig. (2-tailed)		0.06
	N	76	76
Age	Pearson Correlation	-0.217	1
	Sig. (2-tailed)	0.06	
	N	76	88

Research Question 6

What is the relationship between attitudes towards mathematics and mathematics course they are attending?

In order to find out if there is a statistically significant difference between students' attitudes towards mathematics and the course they are attending. The homogeneity of the variances according to Levene's test with $p > 0.05$ as shown in table 16, the data is normally distributed according to Kolomogrov and Shapiro tests with $p > 0.05$ were assumed. Four separate analyses of variances (ANOVA) were conducted as shown in table 18. The results indicated that there were no statistically significant difference between students' attitudes towards mathematics and the course they are attending at $\alpha = 0.05$.

Table 16. The Levene's Test Of Variances Homogeneity

Levene's Test for Equality of Variances			
		F	Sig.
Attitude	Equal variances assumed	0.001	0.979

Table 17. The Four Analyses Of Variances (ANOVA) According To The Math. Courses They Are Attending

Domain		Sum of Squares	df	Mean Square	F	Sig.
Self-Confidence	Between Groups	101.007	2	50.504	2.2	0.118
	Within Groups	1767.743	77	22.958		
	Total	1868.75	79			
Value	Between Groups	69.607	2	34.803	1.53	0.223
	Within Groups	1864.699	82	22.74		
	Total	1934.306	84			
Enjoyment	Between Groups	140.077	2	70.038	2.786	0.068
	Within Groups	2036.626	81	25.144		
	Total	2176.702	83			
Motivation	Between	7.588	2	3.794	0.686	0.506

	Groups			
	Within Groups	453.236	82	5.527
	Total	460.824	84	

Research Question 7

What is the relationship between attitude towards mathematics and high school type?

In order to find out if there is a statistically significant difference between students' attitudes towards mathematics and high school type. By assuming that the homogeneity of the two variances according to Levene's test as shown in table 18, and the data is normally distributed according to Kolomogrov and Shapiro tests with $p > 0.05$. Four separate analyses of variances (ANOVA) were conducted as shown in table 19 .The results indicated that there were no statistically significant differences between students' attitudes and students' high school type.

Table 18. The Levene's Test Of Variances Homogeneity

Levene's Test for Equality of Variances			
		F	Sig.
Attitude	Equal variances assumed	0.001	0.979

Table 19. The Four Analyses Of Variances (ANOVA) According To The High School Type

Domain		Sum of Squares	df	Mean Square	F	Sig.
Self_ Confidence	Between Groups	28.017	1	28.017	1.187	.279
	Within Groups	1840.733	78	23.599		
	Total	1868.750	79			
Value	Between Groups	.090	1	.090	.004	.950
	Within Groups	1934.215	83	23.304		
	Total	1934.306	84			
Enjoyment	Between Groups	32.861	1	32.861	1.257	.266
	Within Groups	2143.841	82	26.144		
	Total	2176.702	83			
Motivation	Between Groups	1.239	1	1.239	.224	.637

DATA ANALYSIS OF THE FOUR DOMAINS

Self-Confidence Domain

Table 20 showed that 62.67% of the sample reveals that KUSTAR students felt self-confidence in their ability to do mathematics, whereas, 13.67% of them showed low self-confidence in their ability to do mathematics.

Table 20. The Percentages And Frequencies Of Students' Responses On The Self-Confidence Domain

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Item	11	15	20	20	16

9*					
Item 10*	3	7	17	33	28
Item 11*	3	6	19	40	20
Item 12*	3	5	17	38	25
Item 13*	3	10	19	31	22
Item 14*	1	10	12	37	27
Item 15*	1	15	13	35	23
Item 16	1	14	18	32	21
Item 17	4	6	26	31	19
Item 18	2	13	31	33	8
Item 19	2	6	20	39	20
Item 20*	6	6	22	38	15
Item 21*	2	13	23	33	17
Item 22	1	5	27	39	16
Item 40	0	4	24	39	21
Total	43	135	308	518	298
Percent	3.30%	10.37%	23.66%	39.78%	22.89%

Value Domain

Table 21 showed that 84.40% of the sample reveals that KUSTAR student felt that mathematics has a great value to them. Whereas, 4.29% of them indicated that mathematics has no value for them.

Table 21. The percentages and frequencies of students' responses on the Value domain

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Item 1	4	1	1	17	63
Item 2	3	0	3	9	70
Item 3	0	3	17	35	30
Item 4	1	1	5	30	49
Item 5	1	1	16	38	32
Item 6	0	2	7	36	43
Item 7	0	6	7	38	37
Item 8	2	8	30	35	12
Item 35	0	4	9	46	28
Item 36	0	2	6	41	38
Item 39	0	2	7	37	42
Total	11	30	108	362	444

Percent	1.15%	3.14%	11.31%	37.91%	46.49%

* Indicated Reversed Items

Motivation Domain

Table 22 showed that 67.13% of the sample reveals that KUSTAR students are highly motivated to learn mathematics, whereas, 10.35% of them lack motivation.

Table 22. The percentages and frequencies of students' responses on the Motivation domain

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Item 23	0	6	15	45	22
Item 28*	3	7	7	38	33
Item 32	3	12	28	30	14
Item 33	1	7	24	37	18
Item 34	0	6	24	36	19
Total	7	38	98	186	106
Percent	1.61%	8.74%	22.53%	42.76%	24.37%

* Indicated Reversed Items

Enjoyment Domain

Table 23 showed that 75.49% of the sample reveals that KUSTAR students showed enjoyment in doing mathematics. Whereas, 7.90% of them indicated that mathematics is not an interesting subject.

Table 23. The percentages and frequencies of students' responses on the Enjoyment domain

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Item 3	0	3	17	35	30
Item 24	3	5	10	38	32
Item 25*	4	5	5	38	36
Item 26	2	5	15	44	21
Item 27	8	4	10	20	46
Item 29	2	1	10	38	36
Item 30	2	11	21	36	17
Item 31	0	4	12	40	31
Item 37	2	3	25	41	17
Item 38	1	4	20	39	24
Total	24	45	145	369	290
Percent	2.75%	5.15%	16.61%	42.27%	33.22%

* Indicated Reversed Items

DISCUSSION and CONCLUSIONS

A common understanding around the world that is students of different ages and of different studying levels are facing difficulties when they attempting to do mathematics. Many researches indicated that these difficulties might due to mathematics teachers, curricula, assessment methods or/and teaching strategies used in schools and universities.

Many researches studied the effect of students' attitudes towards mathematics (see e.g. Tapia, 1996, 2004; Tapia& Molavan, 2007) on academic achievement. Some studies outlined that there is no impact of the students' attitudes towards mathematics on their academic achievement (see e.g. Ma and Kishor, 1997; Phonguttha, et al., 2009). Other studies showed that there is a relationship between attitudes towards mathematics and achievement (see e.g. Gottfried 1985; Ma and Xu, 2004; Popham, 2005; Koller, et al. (2001).

This study aimed at identifying the attitudes of Khalifa University of Science, Technology and Research (KUSTAR) students towards mathematics in the light of some variables such as gender, nationality, mathematics scores and the course they are attending. The results of this study showed that there were no statistically differences between students' attitudes towards mathematics according to gender, academic level, high school type and nationality. The results of this study agreed with other studies (see e.g. Casey et al, 2001; Ho, et al., 2000; Ma & Kishor, 1997; Ma, 1999, 1997; Tapia & Molavan, 2007; Tapia &Marsh II ,2004) in that there were no statistical differences between students' attitudes towards mathematics and other factors such as : gender, ethnicity, mathematics scores. In addition, this study outlined that 62.67% of KUSTAR students felt self-confidence in their ability to do mathematics, 84.40% of them felt that mathematics has a great value to them, 67.13% of them are highly motivated to learn mathematics, and 75.49% of the sample reveals that KUSTAR students showed enjoyment in doing mathematics.

Many factors have influences on students' attitudes towards mathematics. Teachers, parents, teaching strategies, assessment methods, and peers, as well as the school environment all have influences on an individual's attitude. I do agree with Tymms (2001) in that the most important factors affecting students' attitudes towards mathematics were the teacher and student academic level, so that more studies have to be conducted in the future to clarify the relationship between teachers' and teaching characteristics on students' attitudes towards mathematics. As well as, to determine how teachers can modify or change their students' attitudes towards mathematics if that is possible, and what the effect of using collaborative learning in schools and universities on changing students' attitudes towards mathematics is. Personally, I think class size, teaching methods and assessment techniques used in our schools and universities might have an impact on the students' attitudes towards mathematics and consequently on their achievements.

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Appendix – A

Dear Student:

This study aims at "Finding out Students Attitudes towards Mathematics at Khalifa University of Science Technology and Research (KUSTAR)".

The information gathered by the questionnaire will be used for educational research only and is not related to your achievement or your performance in mathematics. All results will be kept strictly secret. Please read each statement carefully and write your answers in the space provided.

By filling this questionnaire, you agree to participate in this study

Thank you very much for your cooperation.

The researcher

Demographic Information

Gender	Male	Female	
Date of Birth			
Nationality			
High School Type	Government	Private	
High School Average		University GPA	
Academic Level	Foundation	Degree	
Course & Grade	Pre-Calculus( )	Calculus I( )	Calculus II( )

Attitudes Toward Mathematics Inventory (ATMI)

Directions: This inventory consists of statements about your attitude toward mathematics. There are no correct or incorrect responses. Read each item carefully. Please think about how you feel about each item. Circle the letter that most closely corresponds to how the statements best describes your feelings. Use the following response scale to respond to each item.

PLEASE USE THESE RESPONSE CODES:
A – Strongly Disagree
B – Disagree
C – Neutral
D – Agree
E – Strongly Agree

1. Mathematics is a very worthwhile and necessary subject.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agree

2. I want to develop my mathematical skills.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agree

3. I get a great deal of satisfaction out of solving a mathematics problem.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agree

4. Mathematics helps develop the mind and teaches a person to think.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agree

5. Mathematics is important in everyday life.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

6. Mathematics is one of the most important subjects for people to study.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

7. High school math courses would be very helpful no matter what I decide to stu

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

8. I can think of many ways that I use math outside of school.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

9. Mathematics is one of my most dreaded subjects.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

10. My mind goes blank and I am unable to think clearly when working with mathematics.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

11. Studying mathematics makes me feel nervous.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

12. Mathematics makes me feel uncomfortable.

A Strongly Disagree B Disagree C Neutral D Agree E Strongly Agr

13. I am always under a terrible strain in a math class.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

14. When I hear the word mathematics, I have a feeling of dislike.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

15. It makes me nervous to even think about having to do a mathematics problem.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

16. Mathematics does not scare me at all.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

17. I have a lot of self-confidence when it comes to mathematics

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

18. I am able to solve mathematics problems without too much difficulty.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

19. I expect to do fairly well in any math class I take.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

20. I am always confused in my mathematics class.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

29. I really like mathematics.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

30. I am happier in a math class than in any other class.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

31. Mathematics is a very interesting subject.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

32. I am willing to take more than the required amount of mathematics.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

33. I plan to take as much mathematics as I can during my education.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

34. The challenge of math appeals to me.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

35. I think studying advanced mathematics is useful.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

36. I believe studying math helps me with problem solving in other areas.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

21. I feel a sense of insecurity when attempting mathematics.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

22. I learn mathematics easily.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

23. I am confident that I could learn advanced mathematics.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

24. I have usually enjoyed studying mathematics in school.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

25. Mathematics is dull and boring.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

26. I like to solve new problems in mathematics.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

27. I would prefer to do an assignment in math than to write an essay.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

28. I would like to avoid using mathematics in college.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agr

37. I am comfortable expressing my own ideas on how to look for solutions to a difficult problem in math.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

38. I am comfortable answering questions in math class.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

39. A strong math background could help me in my professional life.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

40. I believe I am good at solving math problems.

A Strongly Disagree | B Disagree | C Neutral | D Agree | E Strongly Agree

(Tapia, 1996)