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## **Students' Attitude Towards Undergraduate Foundation Mathematics Remediation in A He Institution in Gulf Country**

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### **Abstract**

This study outlines causes why Foundation Mathematics students are reluctant to access support and remedial structures that are put in place to enable them to achieve their academic goals. The study was conducted using survey method which included administering a structured questionnaire and one-to-one focused group discussions with students. The study aims to discuss the common tendency of students towards mathematics remediation programmes. This study centred on students' perceptions regarding the teaching & Learning of Mathematics, specifically, however the educational surroundings impacts their perceptions as students of Mathematics in terms of confidence, anxiety, enjoyment, motivation, and therefore the connection of Mathematics in personal and skilled Experiences. Data obtained from this study indicated that factors contributing to poor performance include lack of motivation, poor attitude of students towards Mathematics courses and retrogressive practices. It is envisaged that rising on these factors and sensitization of students to discard practices that proscribe learner's effective participation in finding out the topic may improve their performance in mathematics. It is likely that improved mathematics performance will give learners opportunities to pursue mathematics-related HE degree programmes at higher institutions of learning.

**Key words:** Remediation, Undergraduate, Foundation, Mathematics,

### **Introduction:**

The general attitudes of undergraduate students, who fail in Foundation Maths, towards remedial programmes, have been established to be very low and disconcerting. Students in Foundation programmes have consistently shown poor performances, especially in Mathematics assessments. In most cases, remedial measures have been in place to support them, however, learners have been very reluctant to patronise and access such facilities that are in place to support them. Such attitudes appeared to be prevalent in the Middle Eastern countries due to learner's' fear of being stigmatised and labelled. This study sought to investigate factors that contribute to students' lack of interest and reluctance in utilising all the available remedial strategies and to propose improved strategies that can be adopted to attract undergraduate learners in Foundations Mathematics programmes.

Although the importance of Mathematics courses in college curricula cannot be disputed, it has been observed that learners' interests in taking Mathematics-related courses as their major subjects tends to reduce as they progress through Primary and Secondary schools. By the time students get to college, they tend to develop negative mindsets towards their success in Mathematics.

Mathematics could be a variety of reasoning, that is, thinking mathematically consists of thinking in a logical manner, formulating and testing conjectures, creating sense of things, forming and justifying judgments, inferences, and conclusions. Mathematical behaviour is therefore incontestable after we acknowledge and describe patterns, construct physical and abstract models of phenomena, produce symbol systems to assist represent, manipulate, and reflect on concepts, and invent procedures to resolve problems (Battista, 1999; The Education Alliance 2006). The requirement for effective instruction in mathematics has been more documented in many studies and a few of those findings are supported data from some representative school students (The Education Alliance, 2006).

## General attitudes of students towards remediation

Attitude may be a central part of human identity, since everyday individuals love, hate, like, dislike, favour, oppose, agree, disagree, argue and persuade. All of those are critical responses to an object. Thus, attitudes will be defined as, a summary analysis of an object of thought (Bohner&Wänke, 2002). Attitudes are influenced by 3 parts, which are psychological feature (beliefs, thoughts, attributes), affective (feelings, emotions) and behavioural info (past events, experiences) (G. Maio, G. R. Maio, & Haddock, 2010). Students see little value in the Mathematics course, or its contents and they do not believe that their efforts will improve their performance. They may be demotivated by the structure and allocation of rewards or have other priorities that compete for their time and attention. Although it's likely that a lot of mathematics lessons are schooled in colleges and schools throughout the globe than the other subject (A. Orton, D. Orton, & Frobisher, 2004), However, the quality tests and evaluations reveal that students don't perform to the expected level. The students below achievement in mathematics aren't simply a concern for a country however has become a world concern over the years (Pisa, 2003). mathematics performances of Maldivian students are documented to be very low throughout (Ministry of Education, 2011). As a result, several studies have been conducted in different countries to ascertain factors leading to learners' attitude towards Mathematics (Tahar, Ismail, Zamani & Adnan, 2010; Tezer&Karasel, 2010; Maat & Zakaria, 2010; Bramlett & Herron, 2009; Köğçe, Yıldız, Aydın, & Altındağ, 2009; Tapia & Marsh, 2004; Fennema & Sherman, 1976). More often, the general public image regarding mathematics has been to label it as a tough, cold, abstract, theoretical and ultra-rational subject (Ernest, 2004). However, some studies have shown that learners' have a comparatively positive perspective towards mathematics (Tezer&Karasel, 2010; Yilmaz et al, 2010; Fan, Quek, Yan, Mei, Lionel & Yee, 2005), though individual students might suffer from physical, mental, or alternative personal issues that affect motivation. The poor performance of students in mathematics, for instance, is derived to the method used to teach mathematics courses at the elementary level. The focus, at this level, has been on specific issues and not on building the foundations necessary for understanding higher level mathematics. These foundations may only be designed with a mathematics program that teaches concepts and skills, and problem-solving (Daro, 2006; The Education Alliance, 2006). Mathematics forms the basis or the foundation of scientific and technological knowledge which is vital in socio-economic development of any nation. As a result, Mathematics, among other subjects, is one of the key requirements for entry into tertiary level education in any part of the world. Despite the important role of Mathematics in society, most students' performances in the subject have always been poor at both secondary and tertiary levels. The 'Mathematics problem' of students being ill-prepared mathematically for higher education is well documented (Hawkes and Savage, 2000; Boateng, 2002; Cutler, 2003). The problem of declining mathematical knowledge and skills of students entering higher education is also widely recognized (Mustoe, 2002).

For many years concerns have been expressed concerning the decline in mathematical skills possessed by entrants to engineering and science degree programmes. Students of these days perform less well on diagnostic entry tests than those with apparently similar qualifications from the cohort 10 years earlier. On its own, this decline in key mathematics skills even amongst students United Nations agency obtained affordable a level grades has been of significant concern. the problem has been gathered by different trends in educational activity throughout the 1980's and 1990's that resulted in a widening of the academic background of entrants to those programmes; the implication of this must be befittingly self-addressed. the expansion within the numbers entering educational activity has resulted in a larger number of less qualified students gaining admission into courses to that, previously, they would not have been admitted. Any initiatives, that increase motivation among students and give them different environments in which to boost their mathematics skills are therefore welcomed (Mustoe, 2002). This lack of student's pre-requisite knowledge (Challis and Gretton, 2008) has been described as arising from a complicated set of circumstances including: changes in pre-university mathematics and the diversity of backgrounds of students entering university.

Lack of mathematical ability was suspected and investigated as a contributory factor in students' failures. Cowap (1998) found that there was a high probability (95 to 98%) that students' poor grades in Secondary Mathematics, was a big factor in their withdrawal from HE faculty Diplomas and Degree programmes. There's growing proof

of the importance of students' attitudes and beliefs regarding mathematics for his or her achievement and flourishing applications of the topic (Ernest, 1991), since confidence and belief in students' own ability is particularly important in Mathematics. Some studies have shown that students in Higher Education who are not pursuing Mathematics majors often have negative images, beliefs and attitudes towards mathematics. (Evans, 2000).

There is wide spectrum of students' capabilities, especially among engineering students, of those who can be mathematically very strong through to those who are quite weak. It has been speculated that mathematical achievement is correlated with positive attitude to the subject and typically, confidence in one's own mathematical ability is correlated with achievement. Where such correlations occur, achievement attitude-link forms self-reinforcing cycles. (Ernest, 2000). Low accomplishment or perennial failures in mathematics typically leads to negative attitudes and lowered confidence, inflicting reduced effort or even mathematics turning away, leading to more failure. This is often a positive feedback. On the other hand, positive achievement and success in mathematics usually results in increased attitudes and raised confidence, leading to enhanced effort, persistence and more success. One study reviewed remedial structures on the ground to alleviate students' high failure rates in Mathematics. In that study, authors suggested the following for continued good performance which included, complete coverage of the syllabus, involvement of learners in practical activities, the acquisition and use of appropriate text books and ensuring thorough mastery of the subject contents (Mwenda et al, 2013).

### Objective of study:

This study is aimed at determining causative factors, such as college-based factors, socio-cultural factors and learners' personal circumstances that influence learners' reluctance to access remediation thereby affecting undergraduates' performance in Foundation Mathematics courses. Based on the data obtained, the study will propose strategies that may be adopted to enable learners make full use of remedial plans to improve their performance in Mathematics.

### Methodology:

We adopted a descriptive survey research method, including administering questionnaires and conducting interviews, for the study. Our sample size was 50 respondents, which was made up of students who were repeating Mathematics 1 course since they failed to meet the criteria for passing Mathematics 1 assessments at the end of the previous semester. The data collecting instrument was prepared using online resources, such as Google forms, which is a Google plug-in designed for constructing questionnaires. After constructing the questionnaire, it was piloted by sharing with a small group of faculty and students, prior to sending it to the sampled population. After collecting data, it was analysed using the appropriate data analysis tools such as using Descriptive Statistical analysis tool in Excel.

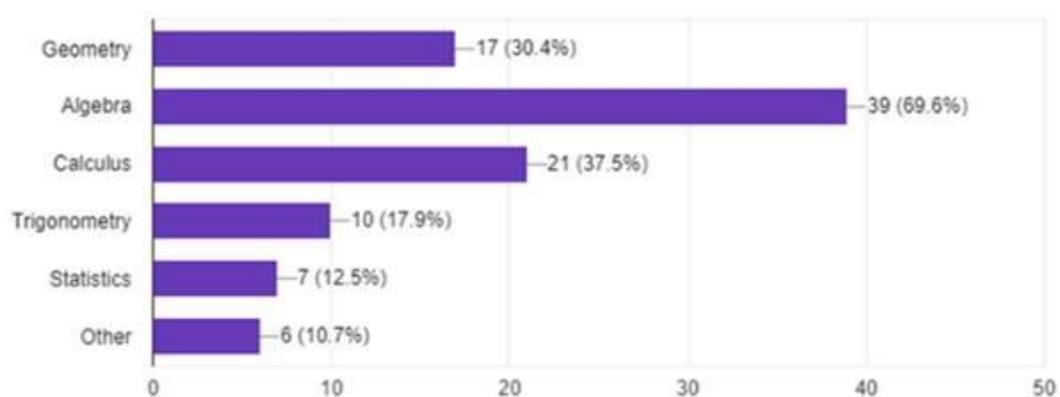
### Findings/Results

Table 1: The key questions used in the data collection instrument are listed below including their responses.

Question No.	Questions	Attribute	Outcomes from the survey (%)
1	Do you know the importance of the Mathematics course for your degree programme?	not aware aware	44.6% 55.4%
2	What were your scores in Mathematics when you were in the Secondary school/High School?	Above 90% 70% - 90%	1.9% 63.6%

		below 70%	34.5%
3	Are you satisfied with the Mathematics course in the Foundation programme?	Yes	39.3%
		No	37.5%
4	What main topics in Mathematics do you find difficult or challenging?	Algebra	69.6%
		Geometry	30.4%
5	What are your reasons for your reluctance to attend Mathematics support classes?	No suitable timings	30.4%
		I can study/revise on my own	32.6%
6	What kind of support classes may be beneficial for you as a student?	One-to- one teaching	39.3%
		Group teaching	32.1%
		Support classes during vacation time	8.9%
7	Have you ever met your tutor during office hours?	Yes	20.4%
		No	79.6%
8	Which of the following are you interested in attending, if any?	Maths Learning Centre (MLC)	53.5%
		Maths Club	34.9%

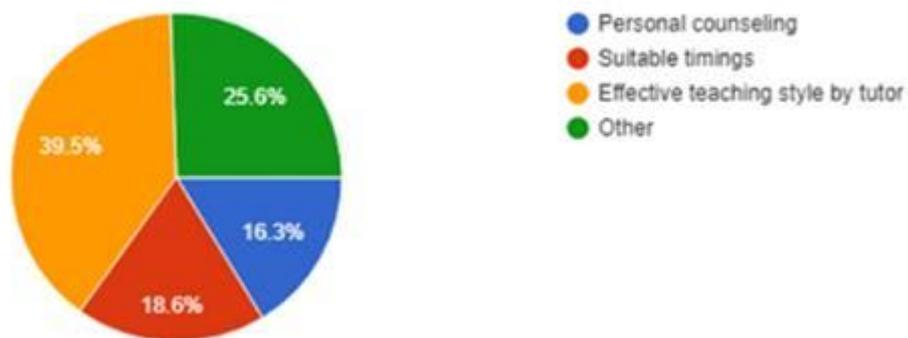
Which topic in Maths do you find difficult or challenging?



**Figure 1:** Figure shows the levels of difficulties (in percentages) learners experience in key Mathematics topics.

The above results (Figure 1) is evidence that the topics in Mathematics which students found most difficult or challenging was in Algebra. This was expressed by over 60% respondents! Similarly, over 30% of the learners indicated that they found Calculus quite difficult. These could be attributed to the High school backgrounds of most of the learners. As a result, they found it quite challenging in adjusting to the Polytechnic's academic and cultural environment during the first semester, which in turn, had a negative effect on their learning.

### What can motivate you to attend these support classes?

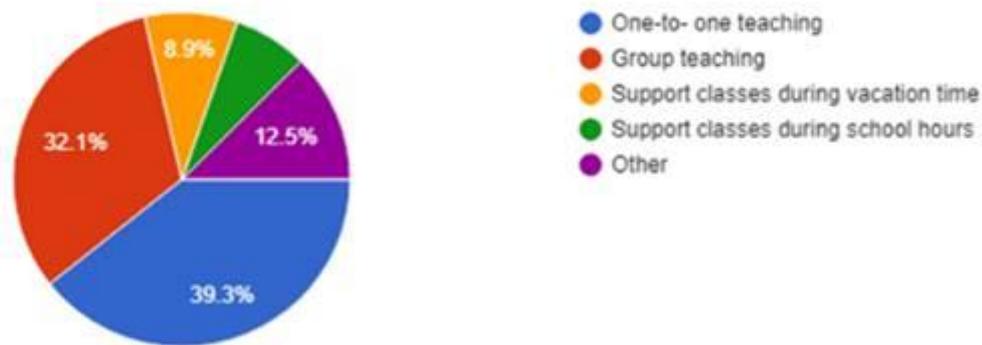


**Figure 2:**Figure shows factors that will motivate learners to attend support classes.

The pie chart depicts the various factors that are likely to motivate learners to attend support sessions. Data suggests that the learners are highly motivated to attend support classes when the teacher adopts an effective teaching style. This incorporates the use of modern and effective techniques including heavy doses of IT-related strategies to make them appreciate and understand the topics in the Mathematics courses.

One would have thought that students who received personal counselling, would have been highly motivated to attend support lessons. However, the data suggested otherwise. That is, learners who were least likely to be motivated to attend support classes were those who received counsel.

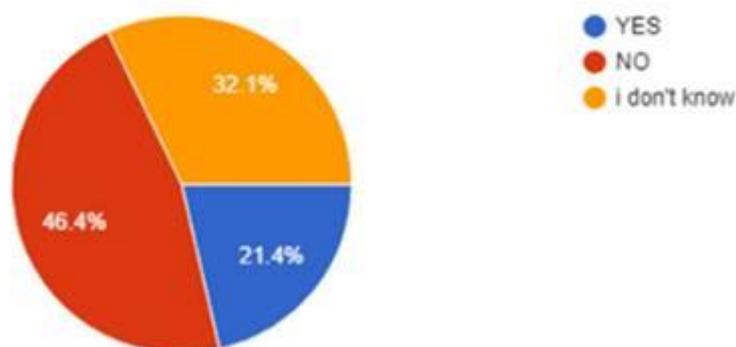
### What kind of support classes can be beneficial for you?



**Figure 3:** Pie chart shows the kind of support classes which will be beneficial to students.

With regards to the kind of support classes which will be beneficial to learners, most of them (nearly 40%) preferred one-on-one sessions with a teacher, (rather than studying in a class room with other students) while around 30%, preferred group teaching. The least popular kind of support among learners was when they are being supported during lessons. most students resent this technique, since it makes them appear to be weak, vulnerable and stigmatized.

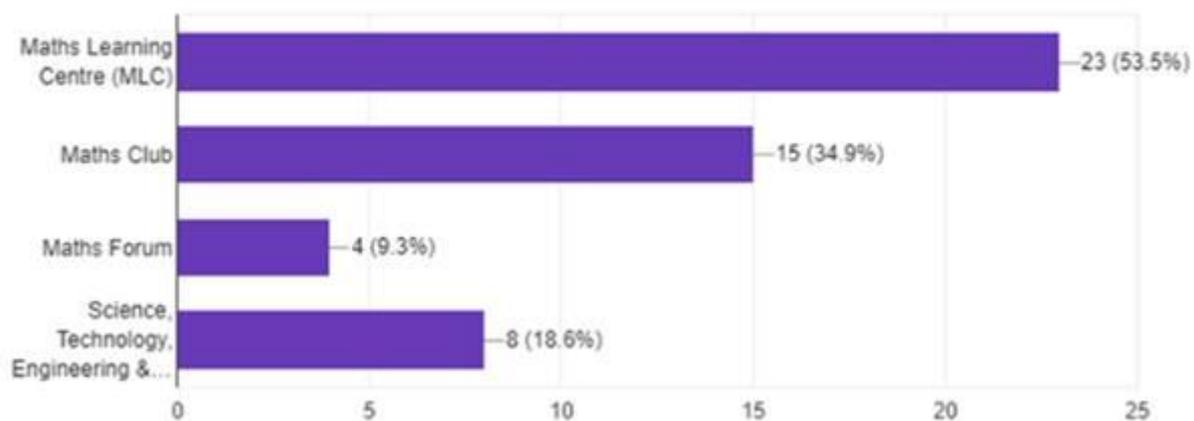
### Is pressure from your classmates playing a role in your attitude towards Maths course?



**Figure 4:** Figure depicts learners' responses to whether peer pressure plays a significant role in their attitudes towards Maths courses.

Nearly 50% of learners' responses to one of the key questions which relates to whether peer pressure plays a significant role in learners' attitude towards Mathematics, in general, indicate that peer pressure did not. This is a rather strong opposition to the influence of peer pressure, although it is known that peer pressure plays a very significant role in learners' attitudes to Mathematics. A significantly smaller number (21.4%), however, agreed that peer pressure played a role in learners' general attitude towards Mathematics.

### Will you be interested in attending any of the following?



**Figure 5:** Figure shows the extent of interest learners have expressed in attending a Mathematics support system.

The above results (from fig 5) are evidence that the students could be highly motivated towards studying Mathematics courses by patronising established Mathematics Learning Centre (MLC) and a Mathematics club. A Maths Forum, they believe, will not motivate them enough towards studying Mathematics.

#### Discussion:

Factors that influence the reluctance of learner's' participation in remedial classes is as a result of learners' failure to meet the assessment criteria for passing the course. It is assumed that factors contributing to poor performance include lack of motivation, poor attitude of students towards the course and retrogressive practices like attending lessons without writing materials. Improving on these factors and sensitization of students to discard practices which prohibit students' effective participation in learning mathematics could improve performance in the subject. It is anticipated that the findings of this study will benefit students, since it will outline measures to alleviate learners' reluctance in taking part in remedial measures and thereby help to improve learners' Mathematics performance and give them opportunities to pursue their chosen degree programmes beyond the Foundation level.

Why do students have such a forceful modification in their attitudes toward mathematics? One potential clarification is that as students grow, they become a lot of conscious of their instructors' interest and enthusiasm for teaching mathematics. They'll be less motivated to find out if they feel that their educator isn't happy teaching the subject. Instructors World Health Organization care regarding students should notice that creating positive surroundings in which to show and learn mathematics could reduce performance anxiety and encourage enjoyment in mathematics. Another potential clarification for the modification in student attitudes toward mathematics would be the nature of the classroom. College courses tend to be instructed largely by lecture methodology instead of using activities that encourage learner participation. There should be additional emphasis on communication within the classroom where the student's area unit inspired to share their thinking processes and justify their answers aloud or in writing. Lecturers, tutors or teachers can use a range of techniques, like discussion, problem solving, discourse, and writing to not only encourage communication, however, to additionally scale back anxiety and increase positive attitudes. Poor tendencies among college students in arithmetic lecture rooms area unit a standard prevalence. It generates negative learning environments and creates hostility toward the topic. Too usually students become irritable with themselves as a result of them can't grasp the ideas being instructed. In turn, students refuse to complete homework or raise

queries for concern of asking a few problems they suppose everyone else understands. The challenge, therefore, is to produce Mathematical experiences that are faithful the spirit of mathematics yet additionally relevant to students' futures in different fields. The question then isn't whether or not they want mathematics, however what mathematics is required and in what context".

### **Conclusions and Recommendations:**

Based on the data obtained from the study, we proposed the following: that a faculty member should be designated solely to offer one-to-one support to learners (regardless of their choice of degree majors). on the other hand, faculty members' time tables could be structured such as to offer the one-on-one support to learners. This might be an expensive alternative since it will involve resources, particularly faculty time; however, it may prove beneficial because of the anticipated improvement in students' examination results, giving them more confidence in Mathematics, and much improved retention rates.

Research projects assigned to students helped to sustain their interests, in addition to learning basic concepts. Therefore, by using standards-based practices, which included strategies such as cooperative learning, discussion, and problem solving within their groups, students will remain consistent with trends and reforms in Undergraduate Mathematics education. Learners could, further, be assigned with more practical projects laced with Mathematical concepts to improve and sustain their interests in Mathematics.

To further develop students' interest in Mathematics, we proposed setting up a Mathematics club which can organise and coordinate Mathematics-related events like Quizzes, symposia, workshops and seminars featuring both internal and external speakers. In addition to that, the Mathematics departments could organise Poster competitions and other similar activities, with the hope that these events will whip up learners' interest in Mathematics to a very large extent.

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