

# Feedback Seeking Behaviour, Classroom Learning Environment and Mathematics Anxiety of Polytechnics Students in Malaysia

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**Abstract:** The aim of this study was to investigate mediating effect of feedback seeking behaviour on the relationship between classroom learning environment and mathematics anxiety. The study sample consisted of 158 students from a selected polytechnic in Malaysia. Questionnaires were used in this study. The results showed that all the variables studied in this study had a mean score values between 4.50 to 5.60. Moreover, the findings also showed that classroom learning environment and feedback seeking behaviour has an influence towards mathematics anxiety. Specifically, based on the result of the data analysis, it can be concluded that feedback seeking behaviour acts as a full mediator towards the relationship between classroom learning environment (lecturer support and involvement) and mathematics anxiety (learning mathematics anxiety and mathematics evaluation anxiety). Findings suggest that the lecturer support and participation on an ongoing basis is very important in overcoming mathematics anxiety.

**Keywords:** Feedback seeking behaviour; learning environment; mathematics anxiety

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## 0 Introduction

Educational institutions play an importance role to establish a conducive, encouraging, and comfortable

learning environment. However, in reality, many educational institutions have targeted key performance indicators that have been assigned to demonstrate how effectively an institution is achieving success at reaching their targets. In the context of polytechnics Malaysia, various efforts especially on the cognitive component in the mathematics learning have been made to ensure that students attending mathematical courses pass the exam. On the other hand, studies on the psychological components such as the relationship between mathematics learning environment and mathematics anxiety still has great potential to be studied <sup>[1]</sup>.

## 1 Literature Review

Fraser<sup>[2]</sup> defined the learning environment in the context of social, psychological, and pedagogy where learning happens affecting student achievement and attitude. Fraser, McRobbie, and Fisher<sup>[3]</sup> has developed a questionnaire What is Happening in this Class? (WIHIC) to measure students' perceptions with seven psychosocial dimensions in the classroom learning environment. The seven dimensions of WIHIC include Student Cohesiveness, Teacher Support, Involvement, Investigation, Task Orientation, Cooperation, and Equity.

Mathematics anxiety is defined as an unpleasant feeling raises emotional distress and a sense of tension in the number and solve mathematical problems in the daily and academic life<sup>[4-6]</sup>. Ashcraft<sup>[7]</sup> also notes that mathematics anxiety refers to the feeling of tension, anxiety or fear that interferes with

the mathematic performance. Moreover, mathematics anxiety can create self-denial and interrupting affective and cognitive processing and ongoing activities that involve working memory<sup>[7]</sup>. According to Ashcraft<sup>[7]</sup>, individuals with a high level of mathematics anxiety have a strong tendency to avoid further weakening the mathematical efficiency in their career path. Mathematics anxiety if left unchecked could restrain students and thus have a serious impact on student achievement. Khalin's study<sup>[8]</sup> also found that students with high concern have significantly lower achievement in mathematics. Moreover, Arem<sup>[9]</sup> and Philips <sup>[10]</sup> also found that many students were constrained by a feeling of worry when using mathematical skills. The previous research shows that mathematics anxiety does have a profound impact on student achievement and self-learning. This study focuses on two dimensions of mathematics anxiety, first learning mathematics and then mathematical assessment which can be assessed using Revised Mathematics Anxiety Rating scale.

Feedback seeking behaviour is defined as an active effort to determine the suitability of individual behaviour and the ability to achieve organizational goals <sup>[11-12]</sup>. Active attitude of the individual in getting feedback from various sources is essential for improving performance in developing good social relations within the organization<sup>[13]</sup>. This is emphasized by the fact of Ashford, Blatt, and Vandewalle <sup>[12]</sup> where the feedback can be instrumental for addressing the issue of performance uncertainty followers by providing accurate and sufficient information on performance improvements. Thus, the researchers believe that the integration of seeking behaviour feedback in the process of teaching and learning in the mathematical classes was able to reduce anxiety among students. Therefore, the purpose of this study was to investigate the influence of classroom learning environment and feedback seeking behaviour towards mathematics anxiety. Specifically, this study also sought to find out if feedback seeking behaviour has a mediator role in the relationship between mathematics anxiety and learning environment.

## 2 Research Methodology

The study was conducted using a survey method. This quantitative descriptive study seeks to explain a phenomenon that is happening<sup>[14]</sup>. Data obtained using questionnaire were distributed to the respondents represent the population, namely the students under taking mathematics courses in polytechnic. All information has been interpreted quantitatively.

158 polytechnic students were randomly selected to participate in this study into the perception of the students towards the effects of classroom learning environment and feedback seeking on mathematics anxiety. The respondents from various academic departments who were taking mathematics courses at the polytechnic. Descriptive statistical analysis of frequencies and percentages were used to describe the demographics of the respondents to include gender, academic department category, and mathematics course category. The findings in Table 1 indicate the respondent profile of this study. 57.6 percent were male students and 43.7 percent were female students. In addition, 56.3 percent of the respondents were from technical departments and 43.7 percent from the information technology and communication department. Finally, 55.7 percent took engineering mathematics while 44.3 percent of respondents took mathematics under the category of information technology and communication.

This study used a questionnaire adapted from existing instruments. The questionnaire is divided into four parts. Part A has four items to obtain demographic data of sample. Part B with 56 items measures students' perception of seven psychosocial aspects of the classroom learning environment: Student Cohesiveness, Lecturer Support, Involvement, Investigation, Task Orientation, Cooperation and Equity. This part was adapted from the What is Happening in This Class? (WIHIC) questionnaire developed by Fraser, McRobbie, and Fisher<sup>[3]</sup>. It has a seven-point frequency response scale with alternatives ranging from Never to All the Time. There are eight items for each scale in the WIHIC. Part C with 24 items was adapted from Plake and Parker's<sup>[15]</sup> Revised Mathematics Anxiety Rating

scale (RMARS) to measure students' level of anxiety in two areas: Learning Mathematics Anxiety (16 items) and Mathematics Evaluation Anxiety (8 items). This questionnaire originally created by Richardson and Suinn<sup>[16]</sup> consisted of 96 items in these two areas. In this study, the RMARS used a seven-point response scale ranging from Not at All to Too Anxious. Finally, Part D which consists of 4 items was

adapted from Cavanaugh's<sup>[17]</sup> feedback seeking questionnaire to assess the frequency with which the students directly seek feedback from their lecturer (2 items) and friend(s) (2 items). Responses were measured on a seven-point Likert scale ranging from Never to All the time. This questionnaire originally developed by

**Table 1 Respondent Profile (N=158)**

Variables	Categories	Frequency	Percentage
Gender	Male	91	57.6
	Female	67	42.4
Academic Department	Technical	89	56.3
	Information Technology and Communication	69	43.7
Mathematics Course	Engineering Mathematics 1	6	3.8
	Engineering Mathematics 2	37	23.4
	Engineering Mathematics 3	34	21.5
	Electrical Engineering Mathematics	11	7.0
	Mathematical Computing	20	12.7
	Discrete Mathematics	50	31.6

Whitaker<sup>[18]</sup>. Four items representing general feedback seeking were based on Williams and Johnson's<sup>[19]</sup> feedback seeking measure.

After obtaining permission from the Head of Department, the survey which included a cover letter and the questionnaire was distributed to the selected group of programs through the assistance of course lecturers. Respondents were randomly picked up by the lecturers and they were asked to complete the questionnaires. Then, respondents were asked to return the questionnaires directly to the lecturers.

This study used quantitative data analysis. The findings were collected and analysed using Statistical Package Social Science (SPSS Version 24). Initially, a descriptive analysis was carried out to get an idea of the distribution of the sample and the variables of this study. Statistics mean and standard deviation were used to describe the variables of the study. Frequencies and percentages were used to describe

the demographic characteristics of the respondents. Next, multiple regression was used to identify the mediating effect of feedback seeking behaviour on the relationship between learning environment and mathematics anxiety in this study.

### 3 Research Findings

To determine the level of learning environment in the classroom, the seven dimensions of classroom learning environment has shown moderate mean scores between 4.86 and 5.60 (Table 2) on the scale 1 to 7. The dimension of equity reported the highest mean score of 5.60. The mathematics anxiety variable returned a moderate mean score of 4.78 while feedback seeking obtained a mean score of 4.69.

### 4 The Influence of Classroom Learning Environment towards Mathematics Anxiety

Results of the analysis showed the respondents in which the variables of student cohesiveness and involvement have an influence on the level of mathematics anxiety. Significantly, the variable of student cohesiveness [ $F(1, 155) = 3.950, p < .05$ ] accounted for 3 percent ( $R^2 = .03$ ) towards learning mathematics anxiety level. In other words, variable SD ( $\beta = .16, t = 1.99, p < .05$ ) is the predictor of learning mathematics anxiety among respondents. Further, the combination of SD ( $\beta = .03, t = .026, p < .05$ ) and IVM ( $\beta = .24, t = 2.53, p < .05$ ) added 3.4 percent to the variance ( $R^2 = .064$ ) in criterion variable of mathematics evaluation anxiety [ $F(2, 154)$

$= 5.237, p < .05$ ]. Based on these results, researchers found that the integration of student cohesiveness and involvement are two factors that contribute to the level of mathematics anxiety in students of polytechnics.

### 5 The Influence of Classroom Learning Environment towards Feedback Seeking

Results of data analysis show the study population ( $N=158$ ), in which three predictor variables of student cohesiveness, lecturer support and involvement are the predictor variables for the feedback seeking among

**Table 2 Respondent Profile (N=158)**

Variables		Mean (M)	Standard Deviation (SD)
Learning Environment	Student Cohesiveness (SD)	5.47	1.154
	Lecturer Support (LS)	5.53	1.009
	Involvement (IVM)	4.86	1.376
	Investigation (IVG)	5.00	1.228
	Task Orientation (TAO)	5.57	1.125
	Cooperation (COP)	5.56	1.184
Mathematics Anxiety	Equity (EPT)	5.60	1.079
	Learning Mathematics Anxiety (LMA)	4.85	1.814
	Mathematics Evaluation Anxiety (MEA)	4.79	1.561
Feedback Seeking		4.69	1.448

the students. Four other variables, namely investigation, task orientation, cooperation, and equity are not factors towards feedback seeking among the respondents.

Significantly, student cohesiveness variable [ $F(1, 152) = 37.99, p < .05$ ] accounted for 20 percent of the variance ( $R^2 = .200$ ) towards the frequency of feedback seeking among the students. This means the variable of student cohesiveness ( $\beta = .45, t = 6.16, p < .05$ ) was the main predictor towards feedback seeking. Further, the combination of student cohesiveness ( $\beta = .30, t = 3.75, p < .05$ ) and lecturer support ( $\beta = .32, t = 3.75, p < .05$ ) were added as much as 7.8 percent to the variance ( $R^2 = .278$ ) in

feedback seeking among the respondents [ $F(2, 151) = 29.01, p < .05$ ]. The combination of these three variables of student cohesiveness ( $\beta = .13, t = 1.62, p < .05$ ), lecturer support ( $\beta = .19, t = 2.45, p < .05$ ) and involvement ( $\beta = .41, t = 4.96, p < .05$ ) were added 10.1 percent ( $37.9 - 27.8$ ) of the variance ( $R^2 = .379$ ) in the feedback seeking variable [ $F(3, 150) = 30.56, p < .05$ ]. Based on these results, the researchers report the integration of student cohesiveness, lecturer support and involvement are the three predictive factors for feedback seeking frequency among the students who are taking mathematics courses in Polytechnic Kuching Sarawak.

## 6 The Influence of Feedback Seeking Frequency towards Mathematics Anxiety

Results of multiple regression analysis showed that the frequency of feedback seeking [ $F(1, 153) = 17.80, p < .05$ ] has significantly contributed 10.4 percent of the variance ( $R^2 = .104$ ) changes in the level of students' learning mathematics anxiety (LMA). This means feedback seeking variable level is a predictor of the level of students' learning mathematics anxiety ( $\beta = .32, t = 4.22, p < .05$ ). Accordingly, the feedback seeking level [ $F(1, 153) = 10.81, p < .05$ ] significantly contributed about 7 percent of the variance ( $R^2 = .07$ ) changes to the level of students' mathematics evaluation anxiety (MEA). This means that the feedback seeking variable is the predictor on the level of students' evaluation anxiety ( $\beta = .30, t = 3.33, p < .05$ ). Thus, the researcher reported that the feedback seeking has an effect towards the level of mathematics anxiety.

## 7 Mediator Effect of Feedback Seeking Level towards the Relationship between Classroom Learning Environment and Mathematics Anxiety

Guidelines of Baron and Kenny<sup>[20]</sup> were used to analyse the mediator effect for the level of feedback seeking towards classroom learning environment namely (a) lecturer support and (b) involvement with the level of learning mathematics anxiety and mathematics evaluation anxiety. Results of the analysis shown indicate the predictive factor of lecturer support has the effect significantly towards learning mathematics anxiety without the presence of a mediator ( $\beta = .15, p < .05$ ) and no significant effect on mathematics learning anxiety with the presence of a mediator ( $\beta = -.04, p > .05$ ) and the coefficient value is reduced (Table 3). This shows the level of feedback seeking acts as a full mediator towards the relationship between lecturer support and the learning mathematics anxiety. In addition, results of the analysis also indicate the predictive factor of involvement has the effect significantly towards learning mathematics anxiety with the presence of a mediator ( $\beta = .25, p < .05$ ) and no significant effect on mathematics learning anxiety with the presence of a

mediator ( $\beta = -.10, p > .05$ ) and the coefficient value is reduced (Table 3). This shows the level of feedback seeking acts as a full mediator towards the relationship between involvement and the learning mathematics anxiety.

Meanwhile, results of the analysis indicate the predictive factor of lecturer support has the effect significantly towards mathematics evaluation anxiety without the presence of a mediator ( $\beta = .05, p < .05$ ) and no significant effect on mathematics evaluation anxiety with the presence of a mediator ( $\beta = -.09, p > .05$ ) and the coefficient value is reduced (Table 3). This shows the level of feedback seeking acts as a full mediator towards the relationship between lecturer support and the mathematics evaluation anxiety. In addition, results of the analysis also indicate the predictive factor of involvement has the effect significantly towards mathematics evaluation anxiety with the presence of a mediator ( $\beta = .21, p < .05$ ) and no significant effect on mathematics evaluation anxiety with the presence of a mediator ( $\beta = -.08, p > .05$ ) and the coefficient value is reduced (Table 3). This shows the level of feedback seeking acts as a full mediator towards the relationship between involvement and the mathematics evaluation anxiety.

## 8 Discussion and Conclusion

The findings have shown that there is an influence of classroom learning environment on feedback seeking and mathematics anxiety. The findings also reported that feedback seeking has an effect on the level of mathematics anxiety. This can be explained by Deci, Koestner, and Ryan<sup>[26]</sup> that the feedback given has a tendency to increase the student's interest in pursuing his or her academic activities. This will indirectly help reduce the phobia level of students to continue their activities. Feedback seeking is seen as an interactive process which aims to provide learners with insight into their performance<sup>[21]</sup>. In other words, feedback should be capable of supplying information on current practice and offer practical advice for improved performance. The benefits of feedback include increase student confidence, motivation and self-esteem. The findings are



**Table 3 Coefficient Value  $\beta$  for the Effect of Mediator Variable on the Level of Feedback Seeking towards the Relationship between Learning Environment (Lecturer Support & Involvement) and Learning Mathematics Anxiety**

Variable	Dependent Variable											
	LMA ( $\beta$ )		LMA (Without FS) ( $\beta$ )		LMA (With FS) ( $\beta$ )		MEA ( $\beta$ )		MEA (Without FS) ( $\beta$ )		MEA (With FS) ( $\beta$ )	
	LS	IVM	LS	IVM	LS	IVM	LS	IVM	LS	IVM	LS	IVM
Independent Variable	-	-	.15*	.25*	-0.04	-0.1	-	-	.05*	.21*	-0.09	-0.08
Mediator Variable	.32*	.32*	-	-	.31*	.27*	.26*	.26*	-	-	.30*	.21*
Feedback Seeking Level (FS)												
R	0.32	0.32	0.15	0.25	0.32	0.33	0.26	0.26	0.05	0.21	0.27	0.27
R <sup>2</sup>	0.1	0.1	0.03	0.06	0.11	0.11	0.1	0.1	0.01	0.04	0.07	0.07
Adjusted R <sup>2</sup>	0.1	0.1	0.02	0.06	0.1	0.1	0.06	0.1	0.01	0.04	0.1	0.06
F Value	17.8	17.8	3.78	10.37	8.92	9.39	10.81	10.81	0.359	7.24	5.89	5.74
Durbin Watson	1.82	1.82	1.77	1.8	1.83	1.84	1.73	1.73	1.76	1.77	1.76	1.73

\* At the significant level of  $p < .05$

Note: Learning mathematics anxiety (LMA), Mathematics evaluation anxiety (MEA), Lecturer support (LS), Involvement (IVM)

also in line with the views of Levy and Williams<sup>[22]</sup> as well as London and Smither<sup>[23]</sup> where emphasis should be focused on the development of an environment that supports the process of feedback interaction within the organization. In addition, this finding can also be linked to the opinions of VandaWalle, Ganesan, Challagalla, and Brown<sup>[24]</sup> where the positive support given will help the individual to get feedback regularly. Ling, Abdullah, and Ismail<sup>[25]</sup> also explain the positive support, mutual trust, respect for other individual ideas, and consider the feeling of strengthening the feedback search behaviour. In the context of students, too often, view feedback as the responsibility of

someone else, usually teachers, whose job is to provide feedback information by deciding for the students how well they are going, what the goals are and what to do next<sup>[27]</sup>.

Specifically, the findings also found that feedback seeking frequency had a full mediator effect on the relationship between classroom learning environment and mathematics anxiety. Feedback is among the most critical influences on student achievement as emphasized by Hattie and Timperley<sup>[27]</sup>. It should be clear that providing and receiving feedback requires much skills by students and educators. If feedback is directed at the right level, it can assist students to comprehend, engage,

or develop effective strategies to process the information intended to be learned. By implication, every instructor must learn to deliver feedback as is done by the students to ensure that the learning process takes place with the full and effective. Only when providing feedback practiced effectively and integrated with effective instruction in classrooms, then it can be very powerful in enhancing students' learning.

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