

## **The role of emotional engagement in lecturer-student interaction and the impact on academic outcomes of student achievement and learning**

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*Abstract: Engagement has been studied as a multidimensional construct consisting of three subtypes: behavioral, cognitive, and emotional (Fredricks, Blumenfeld, & Paris, 2004). Among these, behavioral engagement has received the most and emotional engagement, the least attention (Fredricks et al., 2004). The current study thus aimed to examine the relationship between lecturer-student interaction, emotional engagement (specifically affective reactions expressed within the classroom), and academic outcomes (such as, student achievement and learning) in a sample of 140 undergraduate psychology students (M = 24, F = 116). Participants were randomly assigned to one of the experimental conditions (i.e., good vs. poor lecturer-student interaction) and completed the Lecturer-Student Interaction (LSI) questionnaire, Class-related Emotions Questionnaire (CEQ), Perception of Learning (POL) Questionnaire, and two measures of academic achievement. Individuals who shared a good interaction with their lecturer reported higher levels of emotional engagement compared to those who shared poor interactions with their lecturers. In addition, while emotional engagement failed to mediate the pathway between lecturer-student interaction and academic achievement, it was found to partially mediate lecturer-student interaction and student learning. The present findings highlight the significance of emotional engagement in enhancing learning outcomes in students.*

*Keywords: emotional engagement, teacher-student interaction, student learning, academic achievement*

Engagement, defined as ‘energy in action’ (Appleton, Christenson, Kim, & Reschly, 2006, p. 428) represents the connection between an individual and the activity in which one is involved (Ainley, 2004; Appleton et al., 2006). The study of engagement is valued for both its positive academic outcomes (Appleton et al., 2006; Fredricks, Blumenfeld, & Paris, 2004) and psychosocial benefits (Reddy, Rhodes, & Mulhall, 2003). In general, high levels of engagement are associated with enhanced achievement (Barkatsas, Kasimatis, & Gialamas, 2009; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996; Wigfeld & Eccles, 2000), effective learning, acquisition of knowledge and skills (Furlong, Whipple, Jean, Simental, Soliz, & Punthuna, 2003; Ladd & Dinella, 2009) as well as better emotional functioning (Skinner, Furrer, Marchand, & Kindermann, 2008). In addition, it also serves as a protective factor against student dropout and involvement in risky activities (Connell, Spencer, & Aber, 1994; Finn, 1989; Finn & Voelkl, 1993; Jimerson, Campos, & Greif, 2003; Skinner et al., 2008; Skinner, Wellborn, & Connell, 1990). While engagement is regarded as more crucial for influencing various outcomes among

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at-risk individuals (e.g., ethnic minorities) (Birch & Ladd, 1997), it has been shown to hold equal relevance for the general student population (Klem & Connell, 2004).

## **I. Engagement Subtypes.**

Past research has studied engagement as a multidimensional construct consisting of three main subtypes: behavioral, emotional, and cognitive engagement; each of which have their own distinct markers (Appleton et al., 2006; Jimerson et al., 2003; Ladd & Dinella, 2009; Sinclair, Christenson, Lehr, & Anderson, 2003). Some of the markers of behavioral engagement include class participation (Chapman, 2003; Jimerson et al., 2003) and exertion of effort on task (Skinner et al., 2008); whereas those of cognitive engagement consist of self-regulation and use of learning strategies (Chapman, 2003; Fredricks et al., 2004). Likewise, emotional engagement can be identified through markers such as identification with the academic institution (Finn, 1989) and expression of affective reactions (e.g., interest) in the classroom (Fredricks et al., 2004; Skinner et al., 2008). The emotional subtype however, has received less attention in comparison to the behavioral and cognitive subtypes (Fredricks et al., 2004). This is partly attributed to the lack of conceptual clarity associated with this subtype (Fredricks et al., 2004). Appleton et al. (2006) for instance, used the term psychological engagement to examine achievement outcomes among high school students though the former included markers (e.g., identification) similar to that of emotional engagement.

### *A. Emotional engagement as a predictor.*

In general, past studies have provided evidence for the role of engagement in influencing academic outcomes such as achievement and learning (Handelsman, Briggs, Sullivan, & Towler, 2005; Skinner et al., 2008; Skinner et al., 1990). Achievement, defined as an indicator of individuals' academic ability is usually assessed through grades on exams and standardized achievement tests (McLean, 2001); whereas learning represents the process through which an individual acquires knowledge (McLean, 2001). Despite this distinction between the two academic outcomes, studies have mainly focused on the role of engagement in influencing achievement of individuals as opposed to learning (e.g., Furrer & Skinner, 2003). In particular, the dominant focus has been on both the behavioral and cognitive subtypes given evidence for their pivotal role in influencing academic achievement (Fredricks et al., 2004; Ladd & Dinella, 2009). Ladd, Birch, and Bus (1999) for instance, found higher levels of cooperative and independent participation (i.e., behavioral engagement) to be predictive of higher achievement among kindergarten children. Similarly, certain markers of cognitive engagement (e.g., self-regulation, persistence, and effort) have also been found to predict academic achievement (Miller et al., 1996).

Emotional engagement as a predictor of academic achievement however has yielded mixed evidence with primary support for its role emerging from studies examining this subtype as part of a general or combined measure (i.e., with behavioral or cognitive engagement) of the construct (Fredricks et al., 2004). For instance, a combined scale of emotional and behavioral engagement was found to predict school performance in African-American youths (aged 10 – 16 years) (Connell et al., 1994). However, given that the separate effects of these subtypes were not examined, evidence for the role of emotional engagement in predicting school performance is inconclusive.

Additional support for this subtype has also been gleaned from research examining achievement emotions (Pekrun, Goetz, Titz, & Perry, 2002). These emotions defined as affective reactions expressed within the classroom (i.e., also an indicator of emotional engagement) comprise of emotions such as enjoyment, hope, and anger which have been linked to achievement outcomes (Frenzel, Thrash, Pekrun, & Goetz, 2007; Pekrun et al., 2002). In support of this, Pekrun, Goetz, Frenzel, Barchfeld and Perry (2011) found positive emotions such as enjoyment to be positively related to the Grade Point Average (GPA) of undergraduate psychology students. However, the associative nature of this finding once again failed to support the role of emotional engagement as a predictor of academic achievement.

Contrary to the aforementioned findings, other studies have found some evidence implying the role of emotional engagement as a predictor of learning as opposed to academic achievement. For instance, Handelsman et al. (2005) developed a student engagement instrument comprising of emotional, skills, performance, and participation/interaction engagement. Although all four subtypes were associated with academic achievement (e.g., assignments grades); only skills (similar to cognitive engagement), performance, and participation/interaction engagement (similar to behavioral engagement) emerged as significant predictors of these outcomes (Handelsman et al., 2005). Emotional engagement in contrast, was predictive of intrinsic outcomes associated with learning (e.g., valuing learning in its own right) (Handelsman et al., 2005). Likewise, Ainley and Ainley (2011) found students' enjoyment of science (i.e., achievement emotions) among other factors to positively predict an interest in learning more about science topics. The current state of evidence thus, reflects limited understanding with respect to the role of emotional engagement in predicting academic outcomes such as achievement and learning.

### *B. Emotional engagement as an outcome.*

Among the various contextual factors posited to influence student engagement, teacher-student interaction (also studied as teacher support and teacher-student relationship) has received substantial support for being the strongest predictor of engagement and the most significant contributor of academic outcomes (e.g., Lam et al., 2012). Past studies examining various aspects of this contextual factor have generally identified a good quality teacher-student interaction to be characterized by high levels of emotional (Fraser & Fisher, 1982; Patrick, Ryan, & Kaplan, 2007), academic, autonomy support, (Skinner & Belmont, 1993) and provision of structure (Jang, Reeve, & Deci, 2010); which have in turn been positively associated with engagement of individuals. Skinner et al. (2008) for instance, found student reports of teacher support (i.e., involvement, structure, autonomy support) to be predictive of increases in emotional engagement and declines in emotional disaffection across the year. Likewise, a longitudinal study by Skinner and Belmont (1993) found teacher involvement (similar to emotional support) to predict emotional engagement in elementary school students. However, both these studies were conducted on young children for whom teacher support is generally regarded as critical (Birch & Ladd, 1997). Hence, whether this contextual factor plays as much an important role among older students (e.g., tertiary students) is yet to be established through further research.

### *C. Emotional engagement as a mediator.*

Given the established links between teacher-student interaction and engagement as well as engagement and academic outcomes, the Self-System Model of Motivational Development (SSMMD) provides a relevant theoretical framework in examining the pathway linking teacher-student interaction, engagement, and academic outcomes (Skinner et al., 2008). According to this model, features of a particular context (e.g., characteristics of teacher-student interaction) are posited to influence the three basic psychological needs of individuals (i.e., need for competence, autonomy, and relatedness) (Ryan & Deci, 2000; Skinner et al., 2008). The extent to which these needs are fulfilled is in turn expected to predict the level of engagement of individuals, which then predicts their academic outcomes (Skinner et al., 2008).

Consistent with this, Hughes and Kwok (2007) found the quality of teacher-student relationship to indirectly predict math and verbal scores of first-grade students through engagement. Likewise, Klem and Connell (2004) found reports of teacher-support (e.g., provision of structure) to have an indirect influence on achievement scores of students through engagement. However, given that both these studies defined engagement of individuals in predominantly behavioral terms (e.g., participation, effort) (Hughes & Kwok, 2007; Klem & Connell, 2004), the applicability of these findings to subtypes such as emotional engagement is unclear.

### *D. Insights gained from the review of literature on engagement and academic outcomes.*

In view of existing findings, it is evident that the lack of conceptual clarity associated with emotional engagement has resulted in this subtype being less researched in comparison to the behavioral and cognitive subtypes (Fredericks et al., 2004). In addition, the tendency to incorporate the emotional subtype into a general or combined measure of engagement has yielded mixed evidence with respect to its role in influencing academic achievement and learning in individuals. As such, the current study defines emotional engagement in terms of “affective reactions of students expressed within academic settings”, given that this aspect has been associated with academic outcomes in general (Frenzel et al., 2007; Pekrun et al., 2002, p. 93). Based upon this conceptually specific definition, the study aimed to explore the unique role of the emotional subtype in influencing achievement and learning of individuals. Furthermore, it sought to clarify if this subtype was more influential in affecting learning than academic achievement of individuals. Moreover, given that past studies have predominantly focused on middle and high school students (e.g., Appleton et al., 2006) within traditional classroom settings (e.g., Reeve & Tseng, 2011), the present study used the SSMMD as a general framework to examine the links between lecturer-student interaction, emotional engagement, and academic outcomes among tertiary students.

### *E. Hypotheses of the current study.*

Three hypotheses were proposed in an attempt to address the gaps identified through the review. Given that past studies have indicated a positive association between the quality of teacher-student interaction (i.e., characterized by emotional, academic, autonomy support, structure) and engagement (e.g., Hughes & Kwok, 2007), hypothesis one aimed to investigate if students who share a good interaction with their lecturer report higher levels of emotional engagement

compared to those who share a poor interaction with their lecturer. Second, in line with studies showing teacher support to be positively related to academic achievement (e.g., Lam et al., 2012), hypothesis two sought to investigate whether students who share a good interaction with their lecturer are more likely to have higher achievement in their respective modules compared to those who shared a poor interaction. Finally, given the inconclusive evidence with respect to the emotional subtype in influencing academic outcomes, hypothesis three aimed to investigate the role of emotional engagement between lecturer-student interaction and academic achievement, as well as lecturer-student interaction and student learning.

## **II. Method.**

### *A. Design.*

The study is comprised of a pilot study and the research study. The independent variable (IV) is the quality of lecturer-student interaction and this consists of two levels: good and poor lecturer-student interaction. The dependent variables (DVs) are academic achievement and perceived learning; whereas the mediator is emotional engagement (MV).

### *B. Participants.*

One-hundred and forty undergraduate psychology students (M = 24, F = 116) from James Cook University, Singapore campus were recruited for the current study; 20 of whom participated in the pilot study. The age of participants ranged from 18 to 53 years ( $M = 22.79$ ,  $SD = 4.78$ ). Participants were recruited primarily through convenience sampling using posters and announcements made during the lectures and tutorials. Individuals who required course credits were awarded 4 credits for the pilot study and 2 credits for the actual study.

### *C. Instruments.*

Materials utilised in the study included an information sheet, an informed consent form, the Lecturer-Student Interaction (LSI) Questionnaire (Appendix 1), the Class-related Emotions Questionnaire (CEQ) (Appendix 2), Perception of Learning (POL) questionnaire (Appendix 3), and achievement measures (Appendix 4).

*Manipulation Check Questions and Demographic Information.* Demographic information requested from participants included their age and gender. In addition, two manipulation check questions “How do you usually feel when you attend this lecturer’s lesson?” and “What are some of the characteristics that you would associate with this lecturer?” were included to ensure that the experimental manipulation was successful (Refer to Appendix 1). In general, participants assigned to the *good* lecturer-student interaction condition were expected to report more positive than negative feelings when attending the lecturer’s lesson, and associate more positive than negative characteristics to the lecturer compared to those assigned to the *poor* lecturer-student interaction condition.

*Lecturer-student Interaction (LSI) Questionnaire.* The 9-item questionnaire, encompassing four aspects of lecturer-student interaction: autonomy, emotional, academic support and provision of structure was used to measure the quality of lecturer-student interaction (IV). Two versions of the questionnaire, one for each experimental condition (i.e., good and

poor) were used. Both questionnaires were identical in all aspects except for minor differences in the instructions. The term 'good' in the instructions "Think of one lecturer in James Cook University who has taught you last semester, with whom you perceive you have a good interaction (i.e. lecturer-student interaction)" was replaced with 'poor' to distinguish the two experimental conditions (Refer to Appendix 1). Two items were used to assess each emotional support, academic support and provision of structure; whereas three items, one of which is reverse-coded, was used to measure autonomy support.

*Emotional support.* Questions on emotional support were adapted from the Instrumental help subscale (Cronbach's  $\alpha = .95$ ) of the Teacher-Student Relationship Inventory (Ang, 2005) and the Teacher-student relationship subscale (Cronbach's  $\alpha = .88$ ) of the Student Engagement Instrument (SEI) (Appleton et al., 2006). An example of an item would be "My lecturer cares about me as a person and not just as a student".

*Academic support.* Items tapping into teacher provision of academic support were adapted from the Teacher Support Scale (Cronbach's  $\alpha = .95$ ) by Metheny, McWhirter, and O'Neil (2008). An example of an item would be "My lecturer was willing to help me learn".

*Autonomy Support and Provision of Structure.* Questions measuring autonomy support and provision of structure were adapted from the Observer's Rating measure used by Reeve, Jang, Carrell, Jeon, and Barch (2004). An example of an item tapping into autonomy support would be "My lecturer was open to student discussions and opinions voiced by students" whereas an item measuring provision of structure would be "My lecturer directed the attention of students to important content (e.g. exam-related material) in the lecture".

All items were rated on a 5-point Likert scale with anchors 1 (*Strongly Disagree*) and 5 (*Strongly Agree*). An Exploratory Factor Analysis (EFA) was conducted with the results indicating items loading on a single factor. Hence, the questionnaire was used as a composite measure of the quality of lecturer-student interaction. The pattern and structure matrix for the one-factor solution of Lecturer-Student Interaction (LSI) Questionnaire is reflected in Appendix 5.

A total score was obtained by summing up the nine items on the scale (possible score range: 9 - 45) such that higher scores were indicative of higher quality lecturer-student interaction. Items in the adapted scale had good internal consistency with a Cronbach alpha coefficient of .89.

*Class-related Emotions Questionnaire (CEQ).* The twelve-item CEQ was adapted from the Class-related Emotions scale of the Achievement Emotions Questionnaire (AEQ) (Pekrun et al., 2002) and was used as a measure of students' emotional engagement (MV) during lecture. The questionnaire assessed six emotions (i.e., enjoyment, boredom, hopelessness, anger, hope, anxiety) frequently expressed in academic settings. Six of the items were reverse-coded. Items were categorized into emotions experienced before (5 items), during (5 items) and after class (2 items) to facilitate recall of emotions experienced at the instance when taking the module. An example of an item would be "I felt frustrated during the lecture". All items were rated on a 5-point Likert scale with anchors, 1 (*Strongly Disagree*) and 5 (*Strongly Agree*) and responses were summed to obtain a single emotional engagement score (possible range: 12 - 60). Higher scores were reflective of greater levels of emotional engagement whereas lower scores were indicative of lower levels of engagement. Both the original CEQ subscales (Cronbach's alpha range: .84 - .93) (Pekrun et al., 2002) and the adapted CEQ (Cronbach's alpha = .95) had good internal consistency.

*Perception of Learning (POL) Questionnaire.* A five-item Perception of Learning (POL) questionnaire was used to assess perceived learning (DV) by students during the lecture. Items were adapted from the Course Experience Questionnaire (McInnis, Griffin, James, & Coates, 2001) and the Online Learning Beliefs, Emotions, and Behaviors Survey (OLBEBS) (Artino, 2009). An example of an item assessing perceived learning is “My lecturer encouraged me to relate what I was learning in the module to what I already know”. All items were rated on a 5-point Likert scale with anchors 1 (*Strongly Disagree*) and 5 (*Strongly Agree*). An overall perception of learning score was obtained by summing up the individual items, with scores ranging from 5 to 25. Both the original (OLBEBS) and the adapted questionnaire had good internal consistency with a Cronbach alpha value of .88 (Artino, 2009) and .91 respectively.

*Achievement measures.* Two grades; one obtained in the module taught by the lecturer from *one* semester ago (i.e., Module grade) and the average grade obtained *two* semesters ago were used as measures of achievement. Both grades were obtained with respect to the current semester in which participants were completing the questionnaires. The module grade was used as the measure of the DV whereas the average grade was used as a control variable. Letter grades were converted to a 5-point Likert scale with anchors 1 (*N*) and 5 (*HD*)<sup>3</sup>.

#### *D. Procedure.*

*Pilot study.* A total of 20 psychology students participated in the pilot study. Participants were randomly assigned to either the ‘good’ ( $n = 10$ ) or the ‘poor’ ( $n = 10$ ) lecturer-student interaction condition. They were then provided with the questionnaires and asked to complete them in the following order: Information sheet, an informed consent form, the Lecturer-Student Interaction (LSI) questionnaire, the Class-related Emotions Questionnaire (CEQ), and achievement measures. The Perception of Learning (POL) questionnaire was not included as part of the pilot study. Instructions (as printed on the questionnaire) to the two groups were as follows: “Think of one lecturer in James Cook University who has taught you (last semester), with whom you perceive you have a GOOD/POOR interaction (i.e. lecturer-student interaction). Answer the following questions keeping this lecturer in mind.” Following this instruction, participants completed the manipulation check questions before proceeding to complete the remaining questionnaires. Participants were not required to identify the lecturer and were assured confidentiality of their responses. Upon completion of the questionnaires, participants were requested to provide their opinions regarding the clarity and comprehensiveness of the measures. Participants were then debriefed about the study and thanked for their participation. The pilot study session lasted for approximately 45 minutes.

Following the pilot study, reliability analyses were conducted on both the Lecturer-Student Interaction (LSI) questionnaire and the Class-related Emotions Questionnaire (CEQ). Both questionnaires had good internal consistency, with a Cronbach alpha value of .80 and .93 respectively. Minor changes were made to the wording and structure of the questions based on participants’ opinions for clearer comprehension. For example, the term ‘hopeless’ in one of the CEQ items “The thought of having to attend his/her lecture made me feel hopeless” was replaced by the synonym ‘discouraged.’ This change was warranted given that the majority of the pilot study participants perceived the term ‘hopeless’ to have a strong negative connotation. Similar changes were made to few other questionnaire items. One item from the Lecturer-Student

Interaction (LSI) questionnaire, “My lecturer tried to incorporate students’ interests into the lecture” was excluded and replaced by two others (Items 5 and 6 as reflected in Appendix 1). Modifications to the questionnaire items during the pilot study and justification for these changes are reflected in Appendix 6.

*Research study.* Procedures for the actual study differed slightly from the pilot in that participants either completed an online ( $n = 95$ ) or a paper-and-pencil version of the questionnaire ( $n = 25$ ). Conducting the study online was not expected to affect the results obtained given evidence for little difference in the accuracy of responses between online and paper-and-pencil methods (Bates & Cox, 2008; Bressani & Downs, 2002; Wharton, Hampl, & Winham, 2003). The online questionnaire elicited mandatory responses for informed consent before inviting the participants to complete the questionnaires. The duration of the actual study was approximately 20 minutes. The online questionnaire, hosted by Survey Gizmo can be viewed at the following link: (<http://edu.surveygizmo.com/s3/822881/Lecturer-Student-Interaction-and-Achievement-1>).

### **III. Data Analysis and Results.**

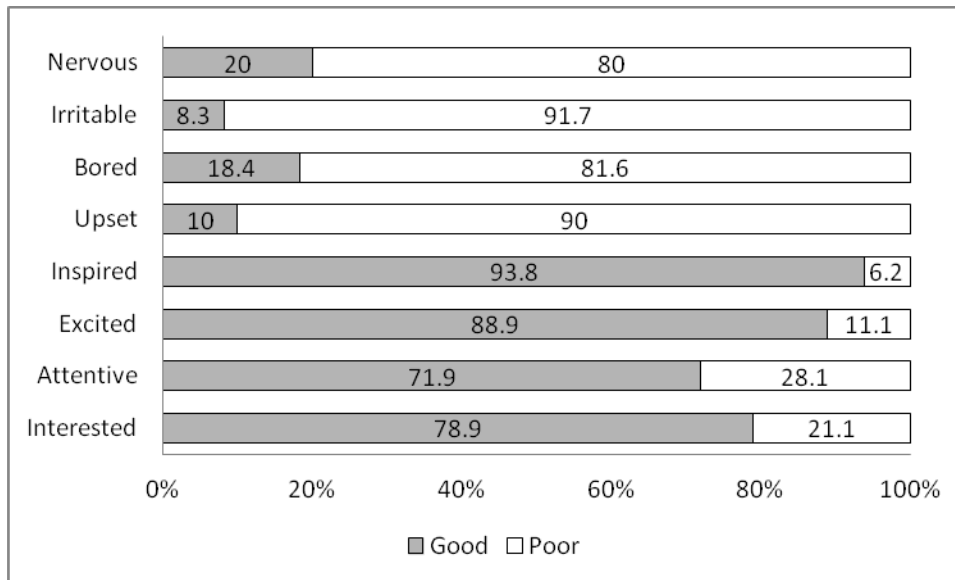
#### *A. Checking of assumptions.*

Only data obtained from the actual study was used for further analysis. All analyses were performed using SPSS Version 18.0. Initial screening revealed no missing data. No serious violations of normality, homoscedasticity, linearity, and multicollinearity were observed. A review of scatterplots, histograms and boxplots revealed no extreme univariate outliers with standard deviations greater than  $\pm 3.30$  (Tabachnick & Fidell, 2007). One multivariate outlier (ID 53) was detected using Mahalanobis distance and was removed. Statistical analyses were performed on the remaining 119 ( $M = 23$ ,  $F = 96$ ) data sets.

#### *B. Descriptives, manipulation check questions and correlations between variables.*

A preliminary analysis was conducted on the manipulation check questions to gauge the success of the experimental manipulation (i.e., assignment to the ‘good’ and ‘poor’ lecturer-student interaction condition). A comparison of percentage values between the two experimental conditions found individuals who shared a good interaction with the lecturer (hereby referred to as ‘good’ interaction condition) to report more positive (e.g., inspired) than negative feelings (e.g., bored) when attending the lecture compared to those who shared a poor interaction (hereby referred to as ‘poor’ interaction condition) (Figure 1).





**Figure 1. Percentage checked on manipulation questions (feelings) between ‘poor’ and ‘good’ interaction conditions.**

Likewise, individuals in the ‘good’ interaction condition associated more positive (e.g., approachable) than negative (e.g., boring) characteristics to the lecturer compared to those in the ‘poor’ interaction condition (Figure 2), with the exception of the characteristics *demanding* and *strict*. Individuals in both the experimental conditions were equally likely to associate the characteristic ‘demanding’ with their lecturer whereas, those in the ‘good’ as opposed to the ‘poor’ interaction condition were more likely to associate the characteristic of ‘strict’ (56% vs. 44%) with their lecturer. Given these results, the manipulation check was deemed successful.

In addition, a correlation analysis conducted revealed predominantly moderate to strong relations between the variables; with the main variables under study: Lecturer-student interaction (LSI), perceived learning (POL), emotional engagement (CEQ), and achievement (module grade) being significantly correlated with one another. A summary of the correlations, means, and standard deviations of the variables used in the study are presented in Table 1 and Table 2 respectively.

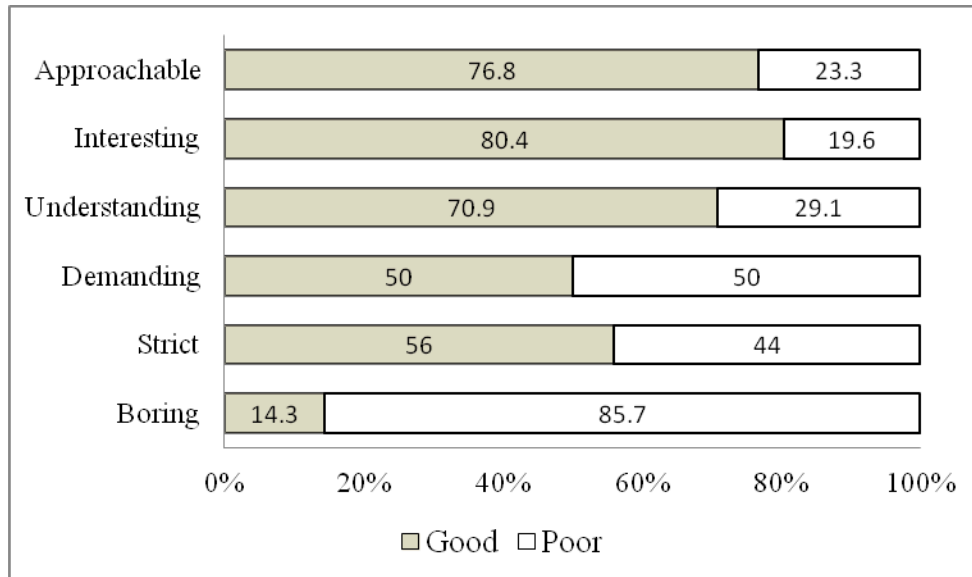
### C. Quality of lecturer-student interactions and emotional engagement scores.

An independent samples *t*-test was conducted to assess the mean difference in emotional engagement scores between individuals in the poor and good lecturer-student interaction conditions. Individuals in the ‘good’ interaction condition ( $M = 43.28$ ,  $SD = 8.91$ ) had significantly higher emotional engagement scores compared to individuals in the ‘poor’ interaction condition ( $M = 31.86$ ,  $SD = 9.38$ );  $t(117) = 6.81$ ,  $p < .001$  (two-tailed), 95% CI [8.10, 14.74],  $\eta^2 = .28$ .

### D. Quality of lecturer-student interaction and academic achievement.

Likewise, an independent samples *t*-test was also performed to compare the academic achievement of individuals between the ‘good’ and ‘poor’ interaction conditions. Individuals

who shared a good interaction with their lecturer ( $M = 3.33$ ,  $SD = .86$ ) did not significantly differ in terms of academic achievement (i.e., grades obtained in the module taught by the lecturer) compared to those who shared a poor interaction with their lecturer ( $M = 3.03$ ,  $SD = .93$ );  $t(117) = 1.83$ ,  $p = .07$  (two-tailed), 95% CI [-0.03, .62].



**Figure 2. Percentage checked on manipulation questions (characteristics) between ‘poor’ and ‘good’ interaction conditions.**

#### *E. Role of emotional engagement between lecturer-student interaction and academic achievement.*

A mediation analysis was conducted to test the viability of emotional engagement (MV) as a mediator of lecturer-student interaction (IV) and academic achievement of individuals (DV). In line with Baron and Kenny’s (1986) 4-step approach; for mediation to occur, the (1) IV should significantly predict the DV, (2) the IV should significantly predict the MV, (3) the MV should significantly predict the DV when the IV is controlled for and (4) the effect of the IV on the DV should reduce (partial mediation) or become insignificant (full mediation) when the MV is included (Baron & Kenny, 1986; Preacher & Hayes, 2004). Three separate multiple regression analyses were conducted to test these pathways, with the effects of average grade and age being controlled in every step, given that these variables significantly correlated with the outcome (i.e., academic achievement) (Tucker et al., 2002).

As illustrated in Figure 3, (1) the quality of lecturer-student interaction (IV) significantly predicted academic achievement of individuals (DV);  $\beta = .34$ ,  $p < .001$ , and (2) the quality of lecturer-student interaction significantly predicted emotional engagement;  $\beta = .80$ ,  $p < .001$ . However, (3) when controlled for the IV, emotional engagement failed to predict academic achievement of individuals;  $\beta = .14$ ,  $p = .16$  (ns). Step 3 of Baron and Kenny’s (1986) 4-step approach was not fulfilled and thus, emotional engagement was found to not mediate the relationship between lecturer-student interaction and academic achievement.

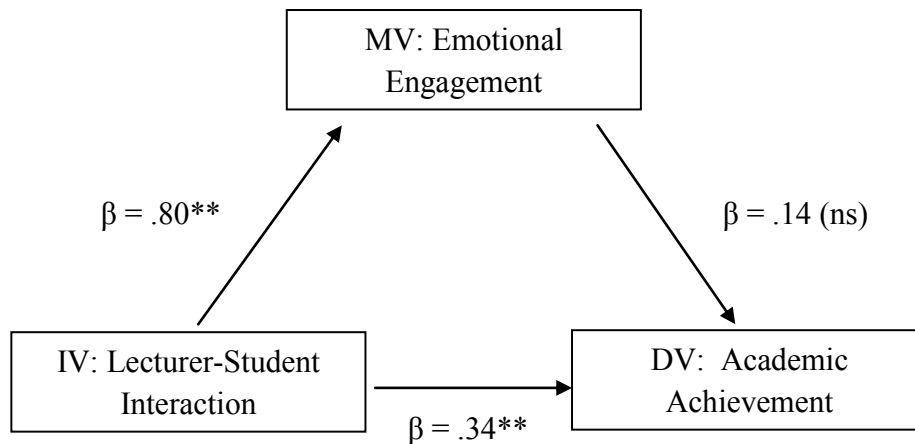
**Table 1. Summary of intercorrelations between LSI, CEQ, POL, age, gender, module grade and average grade.**

| Variables            | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10   | 11    |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| 1. LSI               | -     | .72** | .90** | .90** | .82** | .80** | .78** | .40** | .09   | .03  | .01   |
| 2. Emotional Support | .72** | -     | .56** | .53** | .38** | .53** | .52** | .21** | .06   | .04  | .06   |
| 3. Academic Support  | .90** | .56** | -     | .77** | .72** | .67** | .67** | .38** | .06   | -.05 | .01   |
| 4. Autonomy Support  | .90** | .53** | .77** | -     | .66** | .68** | .71** | .42** | .11   | .10  | -.04  |
| 5. Structure         | .82** | .38** | .71** | .66** | -     | .71** | .73** | .30** | .08   | -.05 | .02   |
| 6. CEQ               | .80** | .53** | .67** | .68** | .71** | -     | .80** | .37** | .08   | .01  | -.001 |
| 7. POL               | .78** | .52** | .68** | .71** | .73** | .80** | -     | .33** | .06   | -.01 | -.11  |
| 8. Module Grade      | .40** | .21** | .38** | .42** | .30** | .37** | .33** | -     | .70** | .05  | .18*  |
| 9. Average Grade     | .09   | .06   | .06   | .11   | .08   | .08   | .06   | .70   | -     | .01  | .17   |
| 10. Gender           | .03   | .04   | -.05  | .10   | -.05  | .01   | -.01  | .05   | .01   | -    | -.05  |
| 11. Age              | .01   | .06   | .01   | -.04  | .01   | -.001 | -.11  | .18*  | .17   | .05  | -     |

\* $p < .05$ , \*\* $p < .001$ , two-tailed.

**Table 2. Means and standard deviations of variables.**

| Variables              | Good ( <i>n</i> = 60) |           | Poor ( <i>n</i> = 59) |           |
|------------------------|-----------------------|-----------|-----------------------|-----------|
|                        | <i>M</i>              | <i>SD</i> | <i>M</i>              | <i>SD</i> |
| LSI Total              | 34.05                 | 4.99      | 27.25                 | 5.85      |
| Emotional Support      | 5.88                  | 1.62      | 4.75                  | 1.64      |
| Academic Support       | 8.17                  | 1.17      | 6.73                  | 1.64      |
| Autonomy Support       | 11.92                 | 1.82      | 9.73                  | 2.13      |
| Structure              | 8.25                  | 1.34      | 6.05                  | 1.93      |
| CEQ                    | 43.28                 | 8.91      | 31.86                 | 9.38      |
| Perception of Learning | 19.25                 | 2.61      | 14.24                 | 4.06      |

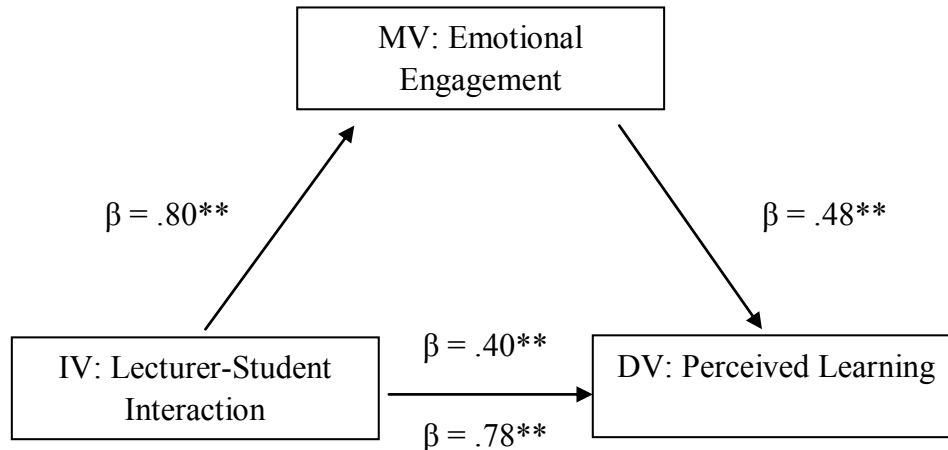


**Figure 3. Emotional engagement as a mediator between lecturer-student interaction and academic achievement of individuals.** Coefficients reflected are standardized beta coefficients. \* $p < .05$ , \*\* $p < .001$ , two-tailed.

#### *F. Role of emotional engagement between lecturer-student interaction and perceived learning.*

A second mediation analysis was conducted to examine emotional engagement as a mediator between lecturer-student interaction and perceived learning by students. Consistent with Baron and Kenny's (1986) 4-step approach, (1) the quality of lecturer-student interaction (IV) significantly predicted perceived learning (DV),  $\beta = .78$ ,  $p < .001$ ; (2) the quality of lecturer-student interaction significantly predicted emotional engagement of individuals (MV),  $\beta = .80$ ,  $p < .001$ ; (3) when controlled for the IV, emotional engagement significantly predicted perceived learning,  $\beta = .48$ ,  $p < .001$  and lastly, (4) the inclusion of the MV in the model weakened the effect of lecturer-student interaction on perceived learning,  $\beta = .40$ ,  $p < .001$  (Figure 4). Hence, emotional engagement was found to partially mediate the pathway between lecturer-student interaction and perceived learning by individuals. In addition, a bootstrap estimate of indirect effect was conducted at 95% confidence interval on 5000 bootstrap samples

(Preacher & Hayes, 2004). Since zero was not in the 95% CI [.13, .35], lecturer-student interaction was also found to have a significant indirect effect on perceived learning through emotional engagement (Preacher & Hayes, 2004).



**Figure 4. Emotional engagement as a mediator between lecturer-student interaction and perceived learning of individuals.** Coefficients reflected are standardized beta coefficients.

\* $p < .05$ , \*\* $p < .001$ , two-tailed.

#### IV. Discussion.

The current study investigated how the quality of lecturer-student interaction (i.e., good vs. poor) influenced the level of emotional engagement of students during lectures and how that in turn affects student achievement (i.e., module grade) and learning in the module taught by the lecturer.

##### A. Findings that address hypothesis one.

In line with hypothesis one, students who shared a good interaction with their lecturer reported significantly higher levels of emotional engagement during the lecture compared to those who shared a poor interaction. This finding offered some support for the Self-System Model of Motivational Development (Skinner et al., 2008). According to the model, features of a context (i.e., characteristics of lecturer-student interaction in the current study) are posited to influence the three basic psychological needs of individuals (i.e., need for competence, relatedness, autonomy), which then serves to predict engagement of individuals (Skinner et al., 2008). Although the lecturer-student interaction measure used in the current study was a global one, it encompassed the four aspects of emotional, academic, autonomy support, and structure. Drawing upon the findings of Hughes and Kwok (2007), it is likely that individuals in the ‘good’ interaction condition received higher levels of support (as characterized by the aforementioned four aspects) in comparison to those in the ‘poor’ interaction condition. Furthermore, past studies have shown each of these four aspects play a role in fulfilling the individual needs for relatedness, autonomy, and competence (Jang et al., 2010; Skinner et al., 2008). As such, in line with the

SSMMD, these higher levels of support experienced by individuals in the ‘good’ interaction condition are likely to have satisfied the three basic needs of individuals to a greater extent, which then could have accounted for the higher levels of emotional engagement reported by these individuals.

*B. Findings that address hypothesis two.*

Contrary to hypothesis two, students who shared a good interaction with their lecturer did not differ in terms of achievement from those who shared a poor interaction. This finding was at odds with past studies such as Lam et al. (2012) and Birch and Ladd (1997) that have shown a supportive, non-conflictual relationship with teachers to promote academic achievement among individuals. A few reasons may account for this finding. Past research has predominantly focused on a younger student population (i.e., elementary, middle, and high school) among whom teacher-student interaction has been found to be crucial for achievement and school adjustment (Birch & Ladd, 1997). However, the current study examined the role of lecturer-student interaction among university students. Hence, it is possible that this factor is not as critical for achievement among this population given that contact time with teachers in university settings is much lesser compared to students in middle and high schools. Instead, given that these students are expected to engage in more independent learning, this latter factor could also be accounting for a substantial portion of variance in achievement.

Second, the grade obtained in the respective module taught by the lecturer is used as a measure of achievement in the present study. Given that tutors, as opposed to lecturers, account for a larger proportion of a given grade for a module, it is likely that interaction with the lecturer may not be significantly reflected in student grades. Rather, the effect of lecturer-student interaction on academic achievement might be moderated by an interaction with the tutor.

*C. Findings that address hypothesis three.*

With respect to hypothesis three, emotional engagement failed to mediate the pathway between lecturer-student interaction and academic achievement of individuals but was a partial mediator between lecturer-student interaction and perceived learning. In particular, emotional engagement failed to predict academic achievement of individuals. Past studies have defined the emotional subtype in several ways (e.g., identification, school liking) (Fredricks et al., 2004; Ladd & Dinella, 2009). Furthermore, the role of emotional subtype pertaining to academic outcomes in past studies is confounded due to the inclusion of behavioral and cognitive subtypes (Fredricks et al., 2004).

Given that the current study used a ‘pure’ measure of emotional engagement (defined as affective reactions expressed by students within academic settings), the non significant outcome between emotional engagement and academic achievement can be viewed from the perspective that by adopting a clear definition of the concept, greater insight has emerged into the significant impact of emotional engagement on student learning. This finding helps deepen current understandings, which can better inform the pedagogical practice of faculty members, such that they impact student outcomes.

An alternate explanation to that proposed above, could be that emotional engagement failed to predict academic achievement due to this subtype having a more central role in predicting other academic outcomes. In line with this reasoning, emotional engagement was

found to significantly predict perceived learning by individuals. This latter finding that emotional engagement plays a more influential role in learning as opposed to academic achievement corroborates with the findings of Handelsman et al. (2005), whereby this subtype emerged as a significant predictor of intrinsic learning outcomes (e.g., developing a positive attitude towards learning) but not as a predictor of academic achievement.

*D. Contributions of findings that enhance current understandings of emotional engagement.*

Findings from the current study thus contribute to existing research in two main ways. First, examining emotional engagement as an attribute on its own rather than as part of a general measure of engagement provides some insight into the role of this subtype's impact (or lack of it) on different academic outcomes (i.e. no significant impact on academic achievement, but significant impact on student learning outcomes). Second, majority of the studies that investigate the concept of engagement have focused on achievement measures (Appleton et al., 2006; Fredricks et al., 2004). While achievement might be an important outcome in itself, it may not be a good indicator of engagement given that individuals who have high achievement may not necessarily be more engaged (Zyngier, 2008). Hence, showing that emotional engagement has a significant role in predicting learning as opposed to academic achievement suggests the possibility that the various subtypes may have differential roles in influencing academic outcomes. Thus, promoting emotional engagement (e.g., interest) of students through varying instructional methods (e.g., using crossword puzzles to test understanding of subject content) (Raines, 2010) for instance, might be useful in creating a learning environment that promotes a positive attitude and openness towards learning (Jang, 2008) which in turn may facilitate cognitive (e.g., exertion of mental effort) and behavioral aspects (e.g., participation in class) of engagement. Given evidence from past studies for behavioral and cognitive engagement as strong predictors of achievement (e.g., Ladd & Dinella, 2009), this then is likely to contribute to academic achievement of individuals (i.e., good grades).

*E. Contributions of findings that enhance current understanding of the role of teacher-student interactions in relation to engagement and academic outcomes.*

Past studies have mainly studied teacher-student interactions among middle and high school students given their importance in influencing achievement, well-being, and school adjustment (e.g., Barkatsas et al., 2009) among this population. However, the current study was able to provide some evidence for the importance of teacher-student interaction in influencing level of engagement in a university population. Furthermore, showing that interactions with the lecturer has an indirect effect on learning through emotional engagement as opposed to academic achievement suggests that at higher levels of education, lecturers might have a more pivotal role in influencing student learning rather than academic achievement.

*F. Limitations of the current study and future directions.*

In applying these findings however, it is important to take into consideration some of the limitations in the present study. Most of the scales utilised in this study (Ang, 2005; Appleton et al., 2006; Metheny et al., 2008; Reeve et al., 2004) were validated on middle and high school students, given that this has been the main population under study. Although this brings the

validity of these items for university students into question, the pilot study attempted to address this limitation by ensuring applicability of the questionnaire items for this population.

Secondly, while mediation suggested some evidence for the directional influence from lecturer-student interaction to emotional engagement to academic outcomes, the cross-sectional design of the current study does not allow for firm conclusions. Furthermore, Furrer and Skinner (2003) among others, have suggested reciprocal relationships between teacher-student interaction and engagement such that individuals who participate actively (behavioral engagement) and display more positive emotions (emotional engagement) are likely to receive more support from teachers. Given this, future studies can look into exploring these reciprocal relationships using a longitudinal design (Fredricks et al., 2004).

### *G. Conclusion.*

Past studies on student engagement have primarily focused on the behavioral and cognitive subtypes of engagement given their established roles in influencing academic achievement of individuals. Emotional engagement on the other hand, has received less research attention due to its associated lack of conceptual clarity. Furthermore, the tendency to examine this subtype as part of a general measure has yielded mixed evidence with respect to its role in influencing academic outcomes. The current study attempted to address these limitations by examining emotional engagement as a 'pure' construct in relation to the separate academic outcomes of learning and achievement. In addition, the present study also investigated the characteristics of teacher-student interactions in relation to engagement and academic outcomes of tertiary students. While current findings build on existing literature in demonstrating the crucial role of lecturers in influencing the aforementioned outcomes in tertiary level students, further research is recommended to validate these findings in this particular population.

In conclusion, this study not only offers new insight regarding the importance of emotional engagement on academic outcomes such as student learning, but it also provides insights for staff on the significance of their interactions on student learning and provides a platform for incorporating in their pedagogical practices aspects of emotional, academic, autonomy support and provision of structure for enhancing emotional engagement and maximising learning. In encouraging faculty to do so, the university needs to ensure that the evaluation instruments given to students for assessing faculty on their pedagogical practice should accurately reflect the quality of the staff in addressing and achieving emotional engagement.



## Appendix

### Appendix 1: Lecturer-Student Interaction Questionnaire and Manipulation Check Questions

Think of 1 *lecturer* in James Cook University who has taught you in SP52 (2011), with whom you perceive you have a **GOOD/POOR** interaction\* (i.e. lecturer-student interaction). Answer the following questions keeping this lecturer in mind. Please note that you will NOT be required to identify the lecturer. All information will be kept CONFIDENTIAL.

#### Manipulation Check Questions

1. How do you usually *feel* when you attend this lecturer's lesson? (Tick all that are applicable)

- |                                     |                                                 |
|-------------------------------------|-------------------------------------------------|
| <input type="checkbox"/> Interested | <input type="checkbox"/> Bored                  |
| <input type="checkbox"/> Attentive  | <input type="checkbox"/> Irritable              |
| <input type="checkbox"/> Excited    | <input type="checkbox"/> Nervous                |
| <input type="checkbox"/> Inspired   | <input type="checkbox"/> Others (Please state): |
| <input type="checkbox"/> Upset      | _____                                           |

2. What are some of the characteristics that you would associate with this lecturer? (Tick all that are applicable)

- |                                        |                                                 |
|----------------------------------------|-------------------------------------------------|
| <input type="checkbox"/> Understanding | <input type="checkbox"/> Demanding              |
| <input type="checkbox"/> Boring        | <input type="checkbox"/> Interesting            |
| <input type="checkbox"/> Strict        | <input type="checkbox"/> Others (Please state): |
| <input type="checkbox"/> Approachable  | _____                                           |

#### Lecturer-Student Interaction (LSI) Questionnaire

Below are some statements that might be descriptive of your lecturer. With reference to the **same** lecturer, circle the option that is most descriptive of him/her.

1. My lecturer cares about me as a person and not just as a student. (Emotional Support)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

2. If the need arose, I would be comfortable with sharing personal matters (e.g. family problems) with my lecturer. (Emotional Support)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

3. My lecturer was available if I needed to clarify my doubts about the lecture. (Academic Support)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

4. My lecturer was willing to help me learn. (Academic Support)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

5. My lecturer initiated interaction and discussions that helped me learn the subject material. (Autonomy Support)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

6. My lecturer was open to student discussions and opinions voiced by students. (Autonomy Support)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

7. My lecturer's teaching style can be described as rigid (i.e. strict) and controlling. (Autonomy Support)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

8. My lecturer had a clear goal of what he/she wanted to achieve during the lecture. (Structure)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

9. My lecturer directed the attention of students to important content (e.g. exam-related material) in the lecture.(Structure)

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

## Appendix 2: Class-related Emotions Questionnaire (CEQ)

Answer the following questions keeping in mind the **same lecturer** whom you thought of previously. The statements below describe feelings that you may have experienced **before**, **during** and **after** a lecture taught by this lecturer. All information will be kept CONFIDENTIAL.

### Before Class

The following questions pertain to feelings you may have experienced **BEFORE** attending a lecture taught by this lecturer. Please circle the most appropriate option.

1. The thought of attending lecture made me lethargic.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

2. I looked forward to learning during his/her lecture.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

3. I felt motivated to attend his/her lecture.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

4. Even before the lecture, I used to worry whether I will be able to understand the material.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

5. The felt discouraged at the thought of having to attend his/her lecture.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

### During Class

The following questions pertain to feelings you may have experienced **DURING** the lecture. Please circle the most appropriate option.

1. I enjoyed listening to his/her lecture.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

2. I was tempted to walk out of the lecture because it was boring.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

3. I felt frustrated during the lecture.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

4. I was focused during his/her lecture that I did not realise time passing.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

5. I felt bored during lecture and therefore I had problems staying alert.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

**After Class**

The following questions pertain to feelings you may have experienced **AFTER** the lecture. Please circle the most appropriate option.

1. I looked forward to the next lecture (of the same module) when the lecture was over.  
Strongly Disagree      Disagree      Neutral      Agree      Strongly Agree  
1                              2                              3                              4                              5

2. I felt glad that I had attended the lecture.  
Strongly Disagree      Disagree      Neutral      Agree      Strongly Agree  
1                              2                              3                              4                              5

### Appendix 3: Perception of Learning (POL) Questionnaire

Please also answer the following questions. Circle the most appropriate option.

1. My lecturer was able to stimulate my interest in the module.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

2. My lecturer explained the subject material such that it had practical value for me (i.e. can relate to everyday experiences).

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

3. My lecturer encouraged me to apply the skills that I have learnt in the course to other modules that I was taking.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

4. My lecturer encouraged me to relate what I was learning in the module to what I already know.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

5. My lecturer encouraged me to develop my own academic interests as far as possible.

|                   |          |         |       |                |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1                 | 2        | 3       | 4     | 5              |

#### **Appendix 4: Academic Achievement Measures**

Please circle the FINAL grade that you obtained in the *module* taught by this lecturer (If unable to remember, please log on to e-student to access your grade). Note that the experimenter will NOT have access to any of your grades.

N      P      C      D      HD

Please also circle the *AVERAGE* grade that you obtained 2 semesters ago. (If unable to remember, please log on to e-student to access your grade). Note that the experimenter will NOT have access to any of your grades.

N      P      C      D      HD

**Appendix 5: The Pattern and Structure Matrix for One-Factor Solution of Lecturer-Student Interaction (LSI) Questionnaire**

| Item             | Pattern        |                | Structure      |                | Communalities |
|------------------|----------------|----------------|----------------|----------------|---------------|
|                  | Coefficients   |                | Coefficients   |                |               |
|                  | Component<br>1 | Component<br>2 | Component<br>1 | Component<br>2 |               |
| 8. Struc 1       | <b>.991</b>    |                | <b>.891</b>    |                | .832          |
| 9. Struc 2       | <b>.906</b>    |                | <b>.854</b>    |                | .740          |
| 5. Aut<br>Spt 1  | <b>.805</b>    |                | <b>.859</b>    | .485           | .748          |
| 4. Acad<br>Spt 2 | <b>.783</b>    |                | <b>.870</b>    | .549           | .786          |
| 3. Acad<br>Spt 1 | <b>.650</b>    |                | <b>.780</b>    | .583           | .674          |
| 6. Aut<br>Spt 2  | <b>.645</b>    |                | <b>.765</b>    | .557           | .640          |
| 2. Emo<br>Spt 2  |                | <b>.840</b>    |                | <b>.797</b>    | .642          |
| 7. Aut<br>Spt 3  |                | <b>.650</b>    | .361           | <b>.679</b>    | .465          |
| 1. Emo<br>Spt 1  |                | <b>.621</b>    | .553           | <b>.744</b>    | .611          |

*Note.* Major loadings for each items are bolded.

## **Appendix 6: Modifications to Pilot Study Questionnaires The Lecturer-Student Interaction**

### **Emotional Support.**

Pilot: My lecturer was ~~interested in me~~ as a person and not just as a student.

Actual: My lecturer (cares about me) as a person and not just as a student. (Qn 1)

Change: The term 'interested in me' was changed to 'cares about me' as the former was considered misleading.

### **Academic Support**

Pilot: My lecturer was ~~not~~ available if I needed to clarify my doubts about the lecture.

Actual: My lecturer (was available) when I needed to clarify my doubts about the lecture (Qn 3)

Change: To clarify understanding.

### **Autonomy Support**

Pilot: ~~My lecturer tried to incorporate students' interests into the lecture.~~

Actual: My lecturer initiated interaction and discussions that helped me learn the subject material. (Qn 5)

Actual: My lecturer was open to student discussions and opinions voiced by students. (Qn 6)

Change: Item was replaced by two new ones to be more specific as participants perceived the term 'students' interests' to be too broad.

Pilot: My lecturer's teaching style can be described as ~~rigid~~ and controlling.

Actual: My lecturer's teaching style can be described as (rigid (i.e. strict)) and controlling. (Qn 7)

Change: To improve clarity of the word 'rigid'.

### **Provision of Structure**

Pilot: My lecturer was ~~organized and~~ had a clear goal of what he/she wanted to achieve during the lecture.

Actual: My lecturer (had a clear goal) of what he/she wanted to achieve during the lecture. (Qn 8)

Change: Item was double-barreled'.

Pilot: My lecturer directed the attention of students to important content in the lecture.

Actual: My lecturer directed the attention of students to important content (e.g. exam-related material) in the lecture. (Qn 9)

Change: To improve clarity of the term 'important content'.

## **Classroom-related Emotions Questionnaire**

### **Before Class.**

Pilot: The thought of attending lecture made me ~~nervous~~.

Actual: The thought of attending the lecture made me feel (lethargic). (Qn 1)

Change: The word 'nervous' was not applicable in lecture settings for most students.

Pilot: I looked forward to learning ~~a lot~~ during his/her lecture.

Actual: I looked forward to learning during his/her lecture. (Qn 2)

Pilot: The thought of having to attend his/her lecture made me feel ~~hopeless~~.

Actual: I felt (discouraged) at the thought of having to attend his/her lecture.

Change: 'Hopeless' perceived to have a strong negative connotation. Replaced by synonym.

### **During Class.**

Pilot: I was tempted to walk out of the lecture because it was ~~so~~ boring.

Actual: I was tempted to walk out of the lecture because it was boring. (Qn 2)

Pilot: I was ~~engrossed~~ in his/her lecture that I ~~do not~~ realise time passing.

Actual: I was (focused) during his/her lecture that (I did) not realize time passing. (Qn 4)

Change: The term 'engrossed' was considered 'too strong' and thus replaced.



**After Class.**

Pilot: I looked forward to the next lecture when the lecture was over.

Actual: I looked forward to the next lecture (of the same module) when the lecture was over. (Qn 1)

Change: To clarify understanding.

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