

Teacher-Student Interpersonal Behaviour and Student Outcomes Among University Students in Indonesia

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Abstract

The study examined whether relationships exist between students' cognitive and affective outcomes and the quality of teacher-student interactions among students in a private university in Indonesia. To measure students' perceptions of the lecturer-student interaction, 422 students from 12 classes were asked to respond to a modified version of the Questionnaire on Teacher Interaction (QTI). A measure of students' achievement was retrieved from the university data base. To measure students' attitudes towards their class, two modified scales from the *Test of Science Related Attitudes* (TOSRA) and a satisfaction scale were used. This study also involved examining differences and similarities between the perceptions of students attending the Computer Science department and the Management department at this information technology university in Jakarta. The study identified which types of interactions are most likely to promote student outcomes in computer-related courses and identified ways in which the university could enhance the teaching and learning process.

Rationale

To date, only a few studies of the learning environment have been undertaken in Indonesia and none have been at the tertiary level. The present study of instructor-student interaction, therefore, has the potential to create a clearer picture of the classroom contexts and patterns of instructor-student interactions that are needed at the tertiary level for students to attain good academic performance and positive attitudes. Such a study provides information that instructors can use to modify their instructor-student interactions in order to cater more adequately for the needs of students. The present study also examined the nature and impact of two factors of learning productivity – interpersonal instructor behaviour and student aptitude – on the affective and cognitive outcomes of university students in Indonesia. This research provided valuable information to the university in which the data were gathered for guiding the development of strategies for improving classroom practices, management and administration policies for computer-related courses. The results of the study also provide guidance to other universities in Indonesia regarding achieving better student outcomes in computer-based education.

Aims

- To develop a valid and reliable instrument in the Indonesian language to assess instructor-student interaction.
- To describe and compare a university Computer Science course and a Management course in terms of instructor-student interaction.
- To investigate whether associations exist between each the two student outcomes of achievement and attitudes and instructor-student interaction.

Background

As early as 1936, Kurt Lewin (1936) recognised that the environment was a determinant of human behaviour. Following Lewin's work, Murray (1938) proposed a Needs-Press Model in which situational variables found in the environment account for a degree of behavioural variance.

Following the work of Lewin and Murray, two research programs focused on developing instruments that could be used to assess the learning environment. Herbert Walberg's *Learning Environment Inventory* (Anderson & Walberg, 1968) and Rudolf

Moos's *Classroom Environment Scale* (Moos & Houts, 1968; Moos & Trickett, 1974) were the first instruments developed to assess students' perceptions of their learning environment. Since this time, the influence of the learning environment on the education process has received a great deal of attention, and there has been much progress in the conceptualisation and assessment of learning environments (Fraser, 1994, 1998). Whilst different approaches, qualitative and quantitative, have been used in conducting research in the field of learning environments, the use of questionnaires to assess students' perceptions has been the predominant method.

Past studies of interpersonal teacher behaviours have indicated that this important element of the learning environment is strongly related to student outcomes. A study conducted among Australian science and mathematics teachers found that those teachers emphasising leadership, friendly and understanding behaviours were more likely to promote student achievement. It also was found that those teachers whom were perceived as less strict were more likely to promote more positive attitudes, whilst those whom were perceived as more strict were likely to promote better achievement (Wubbels, 1993). The study of interpersonal teacher behaviour is important not only for facilitating student outcomes but also for improving teacher competency in classroom communication, and for helping to provide the social and emotional backup that a teacher needs in reaching out to students.

To measure students' and teachers' perceptions of teachers' interpersonal behaviour, Wubbels and his colleagues developed the Questionnaire on Teacher Interaction (QTI) in the Netherlands (Wubbels, Brekelmans, & Hoomayers, 1991). This instrument has also been used in Singapore (Fisher, Rickards, Goh & Wong, 1997; Goh & Fraser, 1998), Korea (Kim, Fisher & Fraser, 2000) and Australia (Fisher, Henderson, & Fraser, 1995). In each case, the studies have found that the quality of the interaction between teachers and students is an important determinant of students' achievement and attitudes.

This relatively new area in classroom environment research involving the QTI has focused mainly on secondary science and mathematics classes in the Netherlands, the USA and Australia. It was considered interesting and timely to extend the use of the QTI from secondary to higher education classrooms and to Indonesia.

This study also investigated associations between students' perceptions of the learning environment and student outcomes. Fraser (1994) tabulated a set of 40 studies in which the effects of classroom environment on students' outcomes were investigated. These studies have involved a variety of cognitive and affective outcome measures and a range of classroom environments instruments across numerous countries and grade levels. There have been a number of studies that investigated associations between the learning environment and student outcomes in countries throughout Asia, including Indonesia (Fraser, Pearse & Azmi, 1982; Schibeci, Rideng & Fraser, 1987), India (Walberg, Singh & Rasher, 1977), Thailand (Fraser, 1984), Singapore (Fraser & Chionh, 2000), Taiwan (Aldridge & Fraser, 2000; Aldridge, Fraser & Huang, 1999) and Brunei (Asghar & Fraser, 1995; Riah & Fraser, 1998). Each of these studies has replicated previous research and suggested that the psychosocial climate of classrooms is an important determinant of student outcomes. The number of such studies undertaken in Indonesia, however, is small, as is the number of studies undertaken at the university level in any country; this makes the present study timely.

Methods

The present study investigated associations between interpersonal instructor behaviour and two student outcomes (achievement and attitudes). The sample consisted of 422 students from 12 research methods classes in one large private university in Jakarta, Indonesia. Two

instruments were used in the present study, namely, the Questionnaire on Teacher Interaction (QTI) and the Test of Computer-Related Attitudes (TOCRA). The instruments were translated into Indonesian using a rigorous process of back-translation (which involved the translation of the English version into Indonesian and the back-translation, by an independent party, into English – allowing the comparison of the two versions) to ensure that each item retained its original meaning (Brislin, 1980).

The *Questionnaire on Teacher Interaction* (QTI) was developed specially for evaluating teacher-student relationships in secondary classrooms (Wubbels, Brekelmans & Hoomayers, 1991). The QTI was originally an instrument in the Dutch language developed for use in a teacher education project at the University of Utrecht, Holland; it focuses on the nature and quality of interpersonal relationships between teachers and students (Creton, Hermans & Wubbels, 1990; Wubbels, Brekelmans & Hoomayers, 1991; Wubbels & Levy, 1993). Later, an English version was used in the USA (Wubbels & Levy, 1991). Interpersonal teacher behaviour is mapped using eight scales circumrotating on the two axes of influence (dominance-submission) and proximity (cooperation-opposition). The eight scales of teacher interaction behaviour (Leadership, Understanding, Helping/Friendly, Student Responsibility/Freedom, Uncertain, Dissatisfied, Admonishing and Strict behaviour) fall naturally within Moos' (1974) category of relationship dimensions.

There have been a number of past studies that have investigated student attitudes towards their class as an outcome measure. However, the majority of these studies focused specially on science-related attitudes. Many of these studies have reported positive associations between students' attitudes towards science and classroom environments (Fraser, 1998).

The present study investigated students' attitudes towards computers in higher education classes in Indonesia. A review of the existing techniques and instruments used to measure students' attitudes revealed that none of the existing instruments met the needs of the present study. Therefore, the researcher constructed her own attitude instrument based on the semantic differential technique of Osgood, Suci and Tannenbaum (1957) and the Test of Science-Related Attitudes (Fraser, 1981). The semantic differential is the most direct method in that it asks respondents about their attitudes towards a certain object. Also, the scales of the semantic differential are 'transparent' (Mueller, 1986). For the present study, the semantic differential technique was selected and used to assess attitudes in areas suggested by the Test of Science-Related Attitudes (TOSRA), which measures seven distinct science-related attitudes among secondary school students. The TOSRA is based on the classification of students' attitudinal aims according to Klopfer's (1971) six categories: attitude to science and scientists, attitude to inquiry, adoption of scientific attitudes, enjoyment of science learning experiences, interest in science, and interest in a career in science. This instrument has been widely used to measure attitudes related to the study of science and was adapted for use in the present study to measure students' attitude towards the internet and students' leisure interest in computers.

Comprehensive field-testing of the QTI and attitude scales were carried out in Indonesia. As a result, amendments were made to improve the comprehensibility of certain items. To improve the economy of the QTI, the number of items was reduced from eight to six items in each of the eight scales. Altogether there were three stages in the statistical procedures undertaken to analyse the data from the various instruments and to investigate associations between the students' perceptions of instructor-student interaction and learning outcomes. To determine the reliability and validity of the questionnaires, factor and item analyses, internal consistency reliability, discriminant validity and one-way ANOVA (to test each scale's ability to differentiate between classrooms) were used. A series of simple and multiple correlation analyses was conducted separately for each outcome to determine the associations between the instructor-student interaction behaviour and learning outcomes

(the course achievement score and student attitudes towards computer) for two units of analysis (the student and the class mean). Finally, multivariate analysis of variance (MANOVA) was performed to investigate differences between the Computer Science and Management departments in terms of outcomes instructor-student interactions.

Findings

The major finding of the present study are organised into four components:

- Validation of the Questionnaire on Teacher Interaction (QTI);
- Validation of the Test of Computer Related Attitudes (TOCRA);
- Comparing students enrolled in Computer Science and Management courses; and
- Associations between student outcomes and lecturer-student interaction.

Validation of the Questionnaire on Teacher Interaction (QTI)

The present study involved modifying, translating and validating existing questionnaires to make them suitable for assessing lecturer-student interaction and student attitudes in Indonesia at the university level. The reliability and validity are reported in this section for the Questionnaire on Teacher Interaction and in the following section for the Test of Computer-Related Attitudes.

To measure students' perceptions of lecturer-student interaction in the classroom, the present study adapted the Questionnaire on Teacher Interaction (QTI) developed by Wubbels, Brekelmans and Hooymayers (1991). However, the 48-item version of the QTI was adapted to form a version suitable for use at the tertiary level in Indonesia. This new Indonesian version of the QTI uses the same eight scales as the original version, namely, Leadership, Helpful/Friendly, Understanding, Student Responsibility/Freedom, Uncertain, Dissatisfied, Admonishing and Strict behaviour. However, the number of items in the Indonesian version was reduced from six to five items per scale, making a total of 40 items altogether.

Factor and Item Analysis for QTI

Principal components factor analysis followed by varimax rotation resulted in the acceptance of this Indonesian version of the QTI comprising 40 items in eight scales with five items each. For the final Indonesian version of the questionnaire, nearly all items have a factor loading of at least 0.40 on their own scale and no other scale.

Table 1 shows the factor loadings for the QTI questionnaire (eight scales, five items per scale) for the sample for 422 students, using the individual student as the unit of analysis along with the percentage of variance and eigenvalue for each scale. For three of the eight lecturer-student interaction scales, namely, Admonishing, Student Responsibility/Freedom and Strict scales, the a priori factor structure was replicated perfectly. For the Dissatisfied, Leadership, Understanding and Uncertain scales, there are one or two items in each scale that loaded at least 0.40 on another scale in addition to their own scale. And the Helpful/Friendly scale has an item with a loading of less than 0.40 with its own scale (namely, Item 32). Therefore, Item 32 was deleted for the purposes of all subsequent data analyses.

Reliability and Ability to Differentiate between Classrooms for QTI

The Cronbach alpha coefficient was computed for each QTI scales as a measure of internal consistency reliability. Table 2 reports the internal consistency reliability of each of the eight scales for the QTI for two units of analysis: the individual student score (N=422) and the class mean score (N=12). The data in Table 2 suggest that the QTI has satisfactory reliability, ranging from 0.65 to 0.87 for the individual as the unit of analysis and between 0.83 and 0.99 using the class mean as the unit of analysis. As expected, the reliability estimates are higher when the class mean is used as the unit of analysis.

Table 1: Factor Loading for Items of the QTI

Item	Factor Loading							
	Admonishing	Helpful / Friendly	Student Responsibility	Dissatisfied	Leadership	Understanding	Uncertain	Strict
Adm56	0.76							
Adm57	0.69							
Adm58	0.73							
Adm59	0.65							
Adm60	0.74							
HFr31		0.49						
HFr32		–						
HFr33		0.59						
HFr34		0.81						
HFr35		0.78						
SRe36			0.73					
SRe37			0.70					
SRe38			0.77					
SRe39			0.67					
SRe40			0.60					
Dis26				0.74				
Dis27				0.82				
Dis28	0.41			0.74				
Dis29				0.76				
Dis30		-0.43		0.44				
Lea46					0.73			
Lea47					0.74			
Lea48		0.46			0.64			
Lea49					0.60			
Lea50		0.56			0.50			
Und61						0.53		
Und62						0.52		
Und63						0.78		

Und64						0.66		
Und65	-0.46					0.60		
Unc51							0.68	
Unc52							0.74	
Unc53			0.41				0.65	
Unc54							0.62	
Unc55			0.42				0.59	
Str41								0.47
Str42								0.67
Str43								0.61
Str44								0.54
Str45								0.59
% Variance	24.58	11.31	8.53	4.42	3.90	2.96	2.72	2.68
Eigenval ue	9.83	4.52	3.41	1.77	1.56	1.19	1.09	1.08

Loadings smaller than 0.4 omitted. N=422 students. Rotation converged in 10 iterations.

Notes: Adm=Admonishing, HFr=Helpful/Friendly, SRe=Student Responsibility, Dis=Dissatisfied, Lea=Leadership, Und=Understanding, Unc=Uncertain, Str=Strict

Table 2: Internal Consistency Reliability (Cronbach Alpha Coefficient) and Ability to Differentiate between Classrooms (ANOVA Results) for Two Units of Analysis for the QTI

QTI Scale	No of Items	Alpha Reliability		ANOVA
		Individual	Class Mean	Eta ²
Leadership	5	0.83	0.97	0.17**
Helpful/Friendly	4	0.78	0.83	0.18**
Understanding	5	0.77	0.98	0.11**
Student Responsibility	5	0.80	0.99	0.08*
Uncertain	5	0.83	0.99	0.09**
Dissatisfied	5	0.87	0.99	0.07**
Admonishing	5	0.85	0.98	0.12**
Strict	5	0.65	0.99	0.11**

* $p < 0.05$ ** $p < 0.01$

The sample consisted of 422 students in 12 classes.

Table 2 reports the ANOVA results for scales of the QTI, indicating that all scales differentiate significantly between Indonesian university classes ($p < 0.05$). Thus, students within the same class perceived the lecturer-student interaction in a relatively similar manner, while within-class mean perceptions of the students varied between classes. The eta² statistic (calculated to provide an estimate of the strength of association between class

membership and the dependent variable) ranged from 0.07 to 0.18 for different scales (see Table 2).

Pattern of Scale Intercorrelations for QTI

Support for the validity of the QTI was also obtained from the intercorrelation matrix which is presented in Table 3 for two units of analysis. Correlations were computed at both the individual student and the class levels, with the expected higher class estimates.

The model of interpersonal teacher behaviour (derived from Leary, 1957) has eight scales of teacher behaviour, namely, Leadership (DC), Helpful/Friendly (CD), Understanding (CS), Student Responsibility/Freedom (SC), Uncertain (SO), Dissatisfied (OS), Admonishing (OD), and Strict (DO) behaviour, which circumrotate in a clockwise direction on the two axes of Influence (DS) and Proximity (CO) (see Figure 1). According to Leary's model (1957), adjacent behaviour scales (e.g., Helpful/Friendly and Understanding) should correlate highest and positively with each other, and the magnitude of the correlation should diminish as the scales become increasingly different as they move further apart from each other until they are diametrically opposite to each other, such as Helpful/Friendly and Dissatisfied, and these should have the highest negative correlation (Wubbels, Creton, Levy & Hooymayers, 1993). This assumption is elaborated further in the graphical representation in Figure 1.

Scale intercorrelations for the QTI (shown in Table 3) generally appear to satisfy this assumption, with minor discrepancies. At the individual level of analysis, the adjacent scales of Admonishing and Strict ($r=0.62$) and Admonishing and Dissatisfied ($r=0.68$) correlate highest and positively. This correlation becomes smaller for scales located further from each other, and the directly opposite scale of Understanding (CS) has the highest negative correlation of -0.83 with the Admonishing scale. Figure 1 illustrates the characteristic assumptions of the model of interpersonal teacher behaviour using the Admonishing (OD) scale's correlations to all other scales when the individual is used as the unit of analysis.

Table 3: Scale Intercorrelations for QTI Using the Individual Student and the Class Mean as the Units of Analysis

QTI Scale	Scale Intercorrelation							
	Leadership	Helpful/Friendly	Understanding	Student Responsibility/Freedom	Uncertain	Dissatisfied	Admonishing	Strict
Leadership	–	0.60	0.49	-0.25	-0.42	-0.26	-0.04	0.34
Helpful/Friendly	0.71	–	0.51	-0.17	-0.33	-0.41	-0.34	0.17
Understanding	0.43	0.72	–	-0.06	-0.40	-0.62	-0.83	0.18

St. Resp./Freedom	-0.64	-0.41	-0.01	-	0.69	0.35	-0.31	-0.21
Uncertain	-0.63	-0.61	-0.33	0.53	-	0.75	0.20	-0.11
Dissatisfied	-0.36	-0.31	-0.34	0.36	0.46	-	0.68	0.12
Admonishing	-0.16	-0.20	-0.38	0.15	0.43	0.59	-	0.25
Strict	0.42	0.22	-0.33	-0.87	-0.46	-0.01	0.62	-

Data above the diagonal are for individual students, while data below the diagonal are for class means.

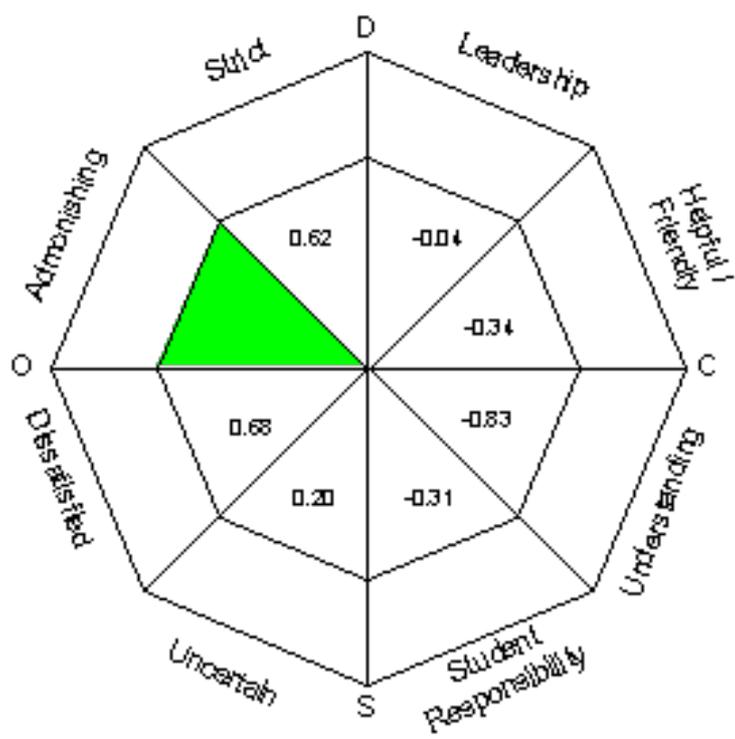


Figure 1: Correlations between Admonishing Scale and Other Scales Using the Individual as the Unit of Analysis

The foregoing discussion suggests satisfactory reliability and validity for the Indonesian version of the QTI based on the factor structure, internal consistency reliability and the pattern of scale intercorrelations for the eight QTI scales. In addition, ANOVA results

indicate that each QTI scale can differentiate between the perceptions of students in different classes. The results of this study of university level students in Indonesia compare favourably with those of secondary students in The Netherlands, the USA and Australia (Wubbels, 1993). Therefore, lecturer and researchers in Indonesia can use the QTI questionnaire with confidence in the future.

Validation of the Test of Computer-Related Attitudes (TOCRA)

To measure students' attitudes towards computer-related studies, the present study adapted selected scales from the Test of Science-Related Attitudes (TOSRA; Fraser, 1981). The response format of the attitude instrument also was modified to make use of the Semantic Differential Technique (Osgood, Suci and Tannenbaum, 1957) in which seven pairs of polarised adjectives were used in conjunction with a five-point response scale.

This study used only three of the seven original scales of TOSRA and modified their names to Student Satisfaction in Computer Studies, Leisure Interest in Computer Studies, and Career Interest in Computers. In addition, for the purposes of this study, an Attitude Towards the Internet scale was developed.

Factor and Item Analyses for TOCRA

The data collected from 422 students in 12 classes were used to perform a principal components factor analysis followed by varimax rotation for the 28 TOCRA items in 4 scales. This resulted in the acceptance of a revised version of the instrument comprising the following 2 scales with 7 items in each: Leisure Interest in Computers and Attitude Towards the Internet. The remaining scales were omitted for subsequent analyses. For the final version of the questionnaire, all items have a factor loading of at least 0.40 on their own scale and not the other scale (see the factor loadings reported in Table 5).

Table 5: Factor Loadings for the TOCRA

Scale	Factor Loading	
	Attitude towards Internet	Leisure Interest in Computers
ATTL1		0.62
ATTLR2		0.54
ATTL3		0.47
ATTLR4		0.48
ATTL5		0.57
ATTLR6		0.75
ATTL7		0.72
ATTI1	0.67	
ATTIR2	0.82	
ATTI3	0.67	
ATTIR4	0.82	
ATTI5	0.52	
ATTIR6	0.82	
ATTI7	0.72	

% Variance	33.89	14.66
Eigenvalue	4.75	2.05

Note: ATTL – Leisure interest in Computer; ATTI – Attitude towards Internet

As well as showing the factor loadings for the TOCRA, Table 5 also reports the percentage of variance and eigenvalue for each scale. Based on the factor and item analyses, a decision was made to retain the 14 items in subsequent analyses.

Alpha Reliability and Scale Intercorrelations for Scales of the TOCRA

The internal consistency reliability (Cronbach alpha coefficient) of each of the two refined scales of the TOCRA for two units of analysis (individual and class mean) are reported in Table 6. The scale reliability estimates for the Leisure Interest in Computers scale was 0.73 using the individual as the unit of analysis and 0.98 using the class mean as the unit of analysis. For the Attitude towards the Internet scale, the reliability estimates were 0.86 using the individual as the unit of analysis and 0.97 using the class mean as the unit of analysis.

The correlation between scales for the two scales of the TOCRA was 0.38 using the individual as the unit of analysis and 0.39 using the class mean as the unit of analysis.

Table 6: Internal Consistency Reliability (Cronbach Alpha Coefficient) and Scale Intercorrelation for Two Units of Analysis for the TOCRA

TOCRA Scale	No of Items	Unit of Analysis	Alpha Reliability	Scale Intercorrelation	
				Leisure Interest in Computers	Attitude towards Internet
Leisure Interest in Computers	7	Individual	0.73	–	0.38
		Class Mean	0.98	–	0.39
Attitude towards Internet	7	Individual	0.86	0.38	–
		Class Mean	0.97	0.39	–

* $p < 0.05$ ** $p < 0.01$

The sample consisted of 422 students in 12 classes.

The results for the factor structure, internal consistency (alpha reliability) and discriminant validity (scale intercorrelation) suggest that the reliability and validity of the two TOCRA scales are acceptable. Therefore, for the purpose of later analysis, this study made use of the two-seven TOCRA scales (Leisure Interest in Computer and Attitude towards Internet) to assess students' attitudes towards computing at the university level.

It can be concluded that the modified Questionnaire on Teacher Interaction (QTI) and the Test of Computer-Related Attitudes (TOCRA) are valid and reliable for use in Indonesia at the university level.

Comparing Students Enrolled in Computer Science and Management Courses

A MANOVA was performed with the eight QTI scales as dependent variables and the course (Computer Science or Management) as the independent variable. The multivariate test yielded significant results ($p < 0.01$) in terms of Wilks' lambda criterion. This meant that there were department differences in the set of criterion variables as a whole. Therefore, t -tests for independent samples were conducted and interpreted for each of the 8 individual QTI scales. The results of the t -tests are shown in Table 7 along with descriptive statistics and effect sizes.

With regards to differences between Computer Science and Management students, statistically significant differences are evident in Table 7 for three lecturer-student interaction scales, namely, Leadership, Helping/Friendly and Understanding behaviour.

With respect to students' perceptions of lecturer interpersonal behaviour, analyses revealed that those enrolled in Management courses perceived their lecturers as exhibiting significantly more positive interaction qualities in terms of Leadership, Helpful/Friendly and Understanding behaviours, compared with students enrolled in Computer Science courses. These differences in the perceptions are presented graphically in Figure 2. Although the magnitudes of the between-department differences on QTI scales generally are not large, it would appear that students enrolled in Management courses consistently perceived their lecturers' interpersonal behaviour more favourably on all scales (i.e., higher scores on scales with a positive connotation and lower scores on scales with a negative connotation) than did Computer Science students (see Figure 2).

Table 7: Differences Between Computer Science and Management Students in Terms of QTI Scales

Scale	Department	Scale Mean	Average Item Mean ^a	Item Standard Deviation	Effect Size	df	t
Leadership	Computer Science	15.10	3.02	0.75	0.41	420	-4.24**
	Management	16.72	3.34	0.73			
Helpful/Friendly	Computer Science	11.65	2.91	0.65	0.63	420	-4.84**
	Management	13.24	3.31	0.61			
Understanding	Computer Science	17.14	3.42	0.68	0.35	420	-3.36**
	Management	18.33	3.66	0.71			
Student Responsibility	Computer Science	10.82	2.16	0.72	0.19	420	1.75

	Management	10.19	2.03	0.68			
Uncertain	Computer Science	10.40	2.08	0.72	0.12	420	1.08
	Management	9.99	1.99	0.76			
Dissatisfied	Computer Science	10.60	2.12	0.82	0.06	420	0.63
	Management	10.33	2.07	0.85			
Admonishing	Computer Science	9.55	1.91	0.74	0.15	420	1.49
	Management	8.99	1.80	0.75			
Strict	Computer Science	14.95	2.99	0.65	0.11	420	-1.08
	Management	15.31	3.06	0.64			

N=278 students enrolled in Computer Science courses and 144 students enrolled in Management courses.

a Average item mean=Scale score divided by the number of items in that scale.

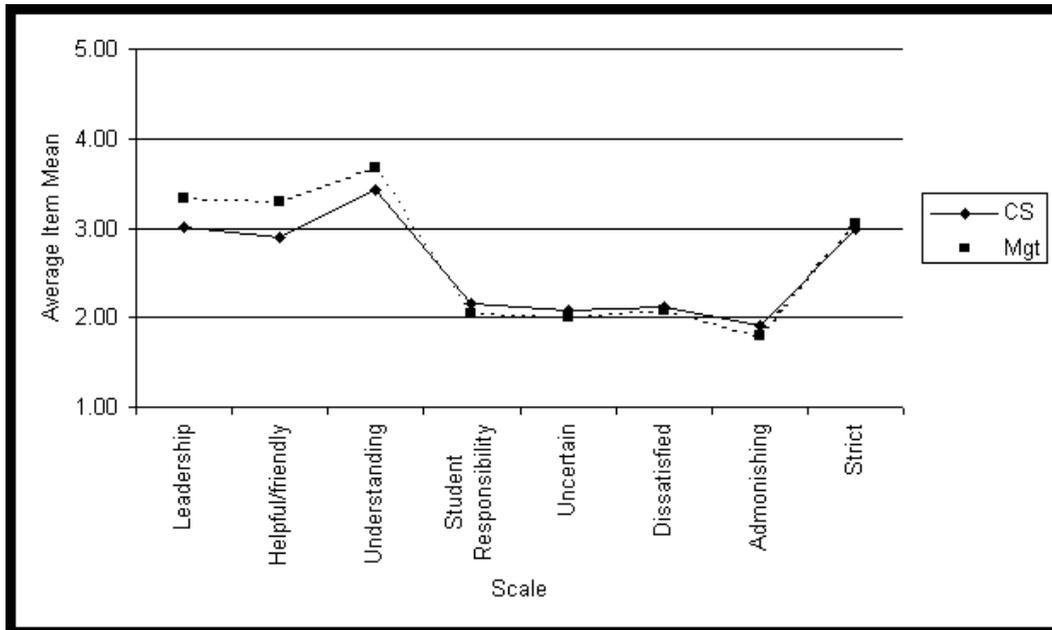


Figure 2: Department Differences in Students' Perceptions of Interpersonal Lecturer Behaviour

Associations Between Student Outcomes and Lecturer-Student Interaction

This section reports associations between interpersonal lecturer behaviour and students' outcomes (cognitive and affective). As a measure of students' achievement, the grade obtained on completion of the Research Methods unit was used for the purposes of the

present study. Students' affective outcomes were measured using the two scales of the TOCRA, namely, Leisure Interest in Computer and Attitude toward Internet.

The statistical procedures used in investigating associations between students' outcomes and interpersonal lecturer behaviour were simple correlation and multiple regression analysis using the individual and the class mean as units of analysis. The multiple regression analysis was performed separately for each outcome measure. The standardised regression weight was computed to provide information about the unique contribution of each scale to an outcome score when all other scales were mutually controlled.

Table 8 shows the results obtained for associations between each of the students' outcomes and each QTI scale. With the individual student as unit of analysis, the results of the simple correlation analysis indicate that the Admonishing, Strict and Dissatisfied scales of the QTI are statistically significantly ($p < 0.05$) and negatively related to the student course achievement score. The Helpful/Friendly scale and the Understanding scale are statistically significantly ($p < 0.01$) and positively related to the student course achievement score.

Table 8: Simple Correlation (r), Multiple Correlation (R) and Standardised Regression Coefficient (b) for QTI Scales and Three Student Outcomes for Individual and Class Mean Units of Analysis

QTI Scale	Unit of Analysis	Associations with QTI Scales					
		Course Score		Leisure Interest in Computers		Attitude towards Internet	
		r	b	r	b	r	b
Leadership	Individual	0.05	0.00	0.00	0.01	0.06	0.17*
	Class Mean	0.05	-0.44	0.38	-0.11	0.27	1.23
Helpful/Friendly	Individual	0.12**	0.09	0.04	0.11	0.02	0.03
	Class Mean	0.37	0.61	0.37	0.11	-0.07	-0.44
Understanding	Individual	0.16**	0.11	-0.09	-0.14*	-0.07	-0.14*
	Class Mean	0.67*	0.57	0.17	1.51	-0.03	0.03
Student	Individual	0.08	0.08	-0.04	-0.04	0.04	0.00
Responsibility	Class Mean	0.16	0.05	-0.24	-0.69	0.14	0.43
Uncertain	Individual	-0.04	0.02	0.01	0.03	0.10*	0.18**
	Class Mean	-0.24	0.46	0.14	0.53	0.48	1.08
Dissatisfied	Individual	-0.12*	-0.02	0.01	0.02	0.03	0.02
	Class Mean	-0.54	-1.28	0.41	0.16	0.38	0.06
Admonishing	Individual	-0.18**	-0.09	0.02	-0.03	0.00	-0.11
	Class Mean	-0.70*	1.19	0.31	1.51	0.12	-0.52
Strict	Individual	-0.16**	-0.16**	0.00	0.00	0.00	0.01
	Class Mean	-0.43	-0.68	0.20	-0.56	-0.07	0.71
Multiple	Individual		0.28**		0.14		0.19*
Correlation (R)	Class Mean		0.81		0.95		0.92

* $p < 0.05$ ** $p < 0.01$

The multiple correlation (R) between students' perceptions of the set of eight QTI scales and the students' course score (Table 8) is only 0.28 at the student level of analysis, but is statistically significant ($p < 0.01$), suggesting that the lecturer-student interaction is positively related to the students' course achievement score. Table 8 indicates that only one of the eight QTI scales uniquely accounts for a significant ($p < 0.01$) amount of variance in course score (the Strict scale) at the student level of analysis.

With the class mean as unit of analysis, for the achievement outcome, the results of the simple correlation analysis (reported in Table 8) indicate that the Admonishing scale is negatively related and the Understanding scale is positively related to achievement. Both are statistically significantly ($p < 0.05$). The multiple regression analysis indicates that none of the eight QTI scales is significantly and independently related to the student achievement.

With the individual student as unit of analysis, the results of the simple correlation analysis reported in Table 8 indicate that none of the eight QTI scales is significantly related to the students' Leisure Interest in Computers and only the Uncertain scale is positively and statistically significantly ($p < 0.05$) related to the students' Attitude Towards the Internet. The multiple correlation (R) between students' perceptions of the lecturer-student interaction was statistically nonsignificant for Leisure Interest in Computers and was 0.19 and statistically significant ($p < 0.05$) for Attitudes towards Internet. For the Attitude Towards the Internet scale, scales that uniquely accounts for a significant proportion of variance are Leadership and Understanding ($p < 0.05$) and Uncertainty ($p < 0.01$). The Leadership and Uncertain scales are both positively related to students' Attitudes towards the Internet, and the Understanding scale is negatively related. For the Leisure Interest in Computers, the standardised regression weights reported in Table 8 indicates that only one of the eight QTI scales, the Understanding scale, uniquely accounts for a significant ($p < 0.05$) amount of variance.

With the class mean as the unit of analysis, the results of the simple correlation analysis and the multiple correlation analysis and the standardised regression weights (reported in Table 8) indicate that all of the QTI scale are statistically nonsignificantly related to the students' Leisure Interest in Computers or the Attitude towards Internet. However, this finding is not surprising given the small sample size for class means, and therefore there is a need to replicate the present study with a bigger sample.

The results indicate that, in terms of interpersonal behaviour, Understanding and Helpful/Friendly behaviours were positively associated with student achievement scores, while Admonishing, Dissatisfied and Strict behaviours were negatively associated with students' achievement score. The results indicate that the Uncertain behaviour was positively related to the Attitude towards Internet scale. Given that the direction of some of the associations between student outcomes and scales of the QTI was unexpected, there is a need to replicate the present research with larger samples.

Discussion and Conclusions

The present study was undertaken primarily to examine lecturer-student interpersonal behaviour, and its impact on the achievement and attitudes of students at the university level in Indonesia. The study also investigated whether there were differences between the Computer Science and Management departments in terms of lecturer-student interpersonal behaviour.

Analyses of the data collected using the QTI resulted in the acceptance of an eight-scale factor structure, indicated comparatively high internal consistency reliability, and supported its ability to differentiate between the perceptions of students in different classrooms. The validity of the Indonesian version of QTI can also be considered satisfactory in terms of the

pattern of scale intercorrelation (i.e., the correlations of a scale with adjacent scales were higher than correlations with other scales). However, a comparison of reliability figures (with the class means as the unit of analysis) reported by Wubbels and Levy (1991) and Wubbels (1993) for studies conducted in secondary schools in other countries and the present study revealed some opposing trends. For the study in the Netherlands, the USA and Australia, the highest reliabilities occurred for Helpful/Friendly behaviour and the lowest alpha coefficient occurred for Student Responsibility/Freedom behaviour. But, for the present study in Indonesia, Helpful/Friendly behaviour had the lowest alpha coefficient and the highest alpha coefficient occurred for Dissatisfied behaviour.

Results for the factor structure, internal consistency (alpha reliability) and discriminant validity (scale intercorrelation) for the modified two-scale version of Test of Computer-Related Attitudes (TOCRA) provide other researchers with confidence to use this economical instrument in the future to assess university students' perceptions of their computer-related attitude.

We found that students from the Management department perceive their lecturers as exhibiting significantly more positive interaction qualities in terms of Leadership, Helpful/Friendly and Understanding behaviour, than do students from the Computer Science department. It would appear that students from the Management department are more likely to be tolerant of the quality of interpersonal lecturer behaviour than students from the Computer Science department.

The simple correlation analysis, with the individual student as unit of analysis, indicated that Admonishing, Dissatisfied and Strict behaviours were negatively associated with course achievement, while Helpful/Friendly and Understanding lecturer behaviour were positively associated with course achievement. This result replicates previous research in Australia (Fisher, Henderson & Fraser, 1997; Henderson, Fisher & Fraser, 2000), Singapore (Fraser & Goh, 2000; Goh & Fraser, 1998; Goh, Young & Fraser, 1995) and Brunei (Riah & Fraser, 1998; Scott & Fisher, 2000). For student attitudes, it was found that only Uncertain behaviour was related positively to the Attitude towards Internet scale and that student perceptions of lecturer behaviour was not related to Leisure Interest in Computers. The multiple correlation indicated that interpersonal lecturer behaviour was positively related to the students' course achievement score and to the Attitudes Towards Internet. Given that the direction of some of the associations between student outcomes and productivity factors was unexpected, there is a need to replicate the present research with larger samples.

This study is important because it is one of only a handful of studies in the field of learning environments in Indonesia, and it represents one of only a few studies worldwide that have focused on the learning environment at the university level. This study is significant in that, by translating, field-testing, refining, validating and using a modified version of the Questionnaire on Teacher Interaction (QTI) with a sample of 422 students in 12 classes, it has provided other researchers with a widely-applicable, parsimonious, valid, economical, and 'non-threatening' instrument for future use in assessing and monitoring students' perceptions of instructor-student interaction. Although the QTI has been used in studies in secondary classrooms in The Netherlands, the USA and Australia (Wubbels, 1993; Wubbels, Brekelmans & Hoomayers, 1991; Wubbels & Levy, 1991), in Brunei (Riah & Fraser, 1998) and in primary schools in Singapore (Goh & Fraser, 1998), this is the first time that it has been used in Indonesia. Finally, in investigating associations between student perceptions of classroom environment and their learning outcomes, the study provides some practical and useful information that makes available tentative guidance for improving student achievement and attitudes through changing the patterns of instructor-student interaction.

Overall, the findings of the present study have made several distinctive contributions to the field of learning environments. It was one of the first learning environment studies to be carried out in Indonesia and one of only a handful of learning environment studies carried out at the university level worldwide. The study provides comprehensive validation information for questionnaires used to measure the lecturer-student interaction and student attitude towards computer-related studies. These instruments, carefully translated into Indonesian, provide a highly-useful starting point for future researchers.

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