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Investigation of tertiary classroom learning environment in Singapore

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Abstract

Over the last three decades, researchers in many countries have shown increasing interest in the conceptualization, assessment and investigation of student perceptions of psychosocial dimensions of their classroom environment. A considerable amount of work on the assessment and investigation of classroom environment in schools were conducted in Singapore over the last few years. These include studies on the associations between students' perception of interpersonal teacher behaviour and learning outcomes in primary mathematics classrooms (Goh & Fraser, 1996) and environment-attitude associations in secondary science classrooms (Wong & Fraser, 1996). However, no studies were made to examine the tertiary learning environment.

This paper reports the first study to focus on the learning environment in the only teacher-training institution in Singapore. The College and University Classroom Environment Inventory, the CUCEI, was used to measure the perceptions of graduate teacher trainees' learning environment and also to examine the associations between attitude and environment. The sample comprised two groups of graduate teacher trainees (primary and secondary teachers) enrolled on the one-year Postgraduate Diploma in Education Programme at the National Institute of Education, Singapore. The findings provided evidence of the reliability of the instrument and a significant attitude-environment relationship as well as gender-related differences among teacher trainees.

Introduction

Classroom learning environment refers to a space or a place where learners and teachers interact with each other and use a variety of tools and information resources in their pursuit of learning activities (Wilson, 1996). The nature of the classroom environment and psycho-social interactions can make a difference in how the students learn and achieve their goals (McRobbie, Roth & Lucus, 1997).

Over the last 30 years, a number of research projects on classroom learning environment have been conducted. The Harvard Project Physics of Walberg (Welch & Walberg, 1972) in the USA and studies by Fraser (1981, 1986) in Australia are noteworthy. Interest in the study of learning environments becomes more prominent when there was evidence that learning outcomes and student attitudes towards learning were closely linked to the classroom environment. Studies were conducted to determine the degree of importance of classroom environment in the teaching-learning process. During this process of studying classroom environments, various forms of measurements were developed to measure the psycho-social or classroom climate in different school contexts. Among the well used instruments for

studying classroom environments in secondary schools were the Learning Environment Inventory (Fraser, Anderson & Walberg, 1982), the Classroom Environment Scale (Moos & Trickett, 1986), the Individualised Classroom Environment Questionnaire (Fraser, 1987), and the latest instrument, What is Happening in this Class (Fraser, Fisher & McRobbie, 1996). For studying classroom environment in primary schools, The Learning Environment Inventory was re-designed to meet this need and became known as the My Class Inventory (Fisher & Fraser, 1981). In addition, to assess the learning environment at higher education level, Fraser & Treagust, (1986) developed the College and University Classroom Environment Inventory.

Apart from these instruments used for studying learning environments at primary, secondary and higher education levels, more instruments were developed and validated in the 1990's for use in specific classroom contexts. The Questionnaire on Teacher Interaction (Wubbels & Levy, 1991) was devised for studying interpersonal teacher behaviour. The Geography Classroom Environment Inventory (Teh & Fraser, 1994) was conceived for examining computer-assisted learning environments. The Constructivist Classroom Inventory (Taylor, Fraser, & Fisher, 1997) aimed at measuring the learning environment of a constructivist classroom.

With the emergence and availability of a whole range of classroom environment questionnaires for use in different school and classroom contexts, the study of learning environments assumes a position of significance. There is currently a wealth of literature on the conceptualisation, evaluation and investigation of student and teacher perceptions of various aspects of the classroom environment (Fraser, 1998, Fraser & Walberg, 1991).

Background to Study

Research in learning environment in Singapore began to appear in the last ten years. But it has covered a wide spectrum of the kinds of such research similar to those done in the USA, Australia, The Netherlands. Among the first studies done in Singapore was the research reported by Lim (1993) who did a study in secondary classroom environments, comparing learning environments in different types of schools (good, average and below average) and different educational streams, (gifted, express and normal). Teh & Fraser (1994) reported a study concerning computer learning environments in secondary geography classrooms. It resulted in the development and validation of a new instrument, the Geography Classroom Environment Inventory. There was also a study on secondary science laboratory environments using the SLEI (Wong & Fraser, 1995) that assessed the learning environment from the perceptions of students and teachers. Studies were also done in gifted education classes (Quek, Wong & Fraser, 1998) and secondary social studies classes (Chionh & Fraser, 1998).

The study in primary mathematics classrooms (Goh & Fraser, 1996; Goh, Young & Fraser, 1995) was distinct in that it was the only study undertaken at primary school level and it combined the study of classroom climate with interpersonal teacher behaviour. Besides studies in secondary and primary classroom environments, Khoo and Fraser (1997) studied the learning environment in adult education computer classes.

Despite these efforts in other educational levels, study of learning environment in one crucial dimension of education in Singapore, teacher education is not yet explored. The graduate teacher trainees and their perceptions of the class environment in their "Teaching and Classroom Management" classes formed the subjects of this investigation. This pioneer study used the College and University Classroom Environment Inventory (CUCEI) to assess the perceptions of these teacher trainees of their psycho-social environment as the CUCEI

was an appropriate tool to use for tertiary level. This was also the first time the CUCEI was used in learning environment research in Singapore.

College and University Classroom Environment Inventory (CUCEI)

The *College and University Classroom Environment Inventory*, (CUCEI), was specially developed by Fraser, Treagust, Williamson & Tobin, (1987) to assess perceptions of the psycho-social environment in university and college classrooms. Originally, the CUCEI was developed for use with small groups of about 30 students in seminars and tutorials in higher education classrooms (Fraser & Treagust, 1986; Fraser, Treagust, & Dennis, 1986). The final form of the CUCEI contains seven scales: Personalization, Involvement, Student Cohesiveness, Satisfaction, Task Orientation, Innovation, and Individualization. Each scale comprises seven items, making a total of 49 items in all. There are four responses provided for each item, namely, Strongly Agree, Agree, Disagree, Strongly Disagree and the polarity is reserved for approximately half of the items. Examples of items are "Activities in this class are clearly and carefully planned" (Task Orientation), and "Teaching approaches allow students to proceed at their own pace" (Individualization). Validation of the CUCEI, conducted by Fraser and Treagust (1986), yielded scale alpha reliabilities ranging from 0.70 to 0.90. The descriptions for each scale and sample items in the CUCEI are shown in Table 1.

Table 1 Scale Descriptions and Sample Items in the College and University Classroom Environment Inventory (CUCEI)

Scale	*Description*	*Item*
Student Cohesiveness	Extent to which graduate teacher trainees know, help and are friendly towards each other	Graduate teacher trainees in this class get to know each other well (+)
Individualisation	Extent to which graduate teacher trainees are allowed to make decisions and are treated differently according to ability, interest and rate of working	Graduate teacher trainees are generally allowed to work at their own pace (+)
Innovation	Extent to which the instructor plans new, unusual class activities, teaching techniques and assignments	New and different ways of teaching are seldom used in this class (-)
Involvement	Extent to which graduate teacher trainees participate actively and attentively in class discussions and activities	There are opportunities for graduate teacher trainees to express opinions in this class
Personalisation	Emphasis on opportunities for individual graduate teacher trainees to interact with the instructor and on concern for graduate teacher trainees' personal welfare	The lecturer helps each student who is having trouble with the work (+)

Satisfaction	Extent of enjoyment of classes	This class is a waste of time (-)
Task Orientation	Extent to which class activities are clear and well organized	Getting a certain amount of work done is important in this class (+)

Items designated (+) are scored by allocating 4,3,2,1 respectively, for the responses Strongly Disagree, Disagree, Agree and Strongly Disagree. Items designated (-) are scored in the reverse order.

Objectives of the Study

The objectives of this study were to (i) provide validation data for the CUCEI when used in the Singapore context; (ii) investigate associations between graduate teacher trainees' attitudes to the course and their perceptions of the classroom environment as assessed by the CUCEI; and (iii) to investigate gender-related differences in graduate teacher trainees' perceptions of their environment.

Methodology

The Sample

The sample for the study comprised of 151 primary graduate teacher trainees from the Postgraduate Diploma in Education Programme (Primary) and 184 secondary graduate teacher trainees were from the Postgraduate Diploma in Education Programme (Secondary). The total sample size was 355. These graduate teacher trainees were actually being trained to teach in different school contexts as primary and secondary school teachers respectively. They have a common course in Teaching and Classroom Management though there are distinct differences in emphasis and illustrations because of different school contexts.

Attitudinal Measures

Graduate teacher trainees' attitudes were measured using two scales. These two scales were (i) Difficulty and (ii) Speed. This part of the questionnaire is adapted from Nair & Fisher (1999). The scale Difficulty was designed to measure the degree of difficulty the teacher trainees encounter in the coursework in class. The scale Speed measured the pacing of the lessons. Typical items are "I am constantly challenged in this class" (Difficulty) and "I have plenty of time to cover the prescribed amount of work" (Speed). Each scale has seven items and each item provides four-point Likert-type response alternatives, ranging from Strongly Disagree, Disagree, Agree to Strongly Agree.

Results

Reliability and Validation of the CUCEI

The data were analysed to test the internal consistency of the CUCEI scales. It was found that the Cronbach Alpha reliability ranged from 0.65 to 0.90. These figures were comparable to the results reported by Fraser, Treagust, Williamson and Tobin (1987). Overall, the Cronbach Alpha reliability of the instrument was found to be at a high of 0.92.

These findings supported the cross-cultural validity of the classroom environment scales when used for the first time in this context. Each scale in the CUCEI was found to display satisfactory internal consistency reliability.

Associations between attitude and environment

In order to find out the associations between environment and attitudinal outcomes, simple correlation coefficients were calculated between each scale of the CUCEI and the attitudinal measures. A multiple regression analysis, involving the whole set of scales in the instrument was conducted to test the association of each scale of the CUCEI with attitudes when all other scales were controlled. Table 2 reports associations of each scale of the CUCEI with the graduate teacher trainees' attitudinal outcomes.

An examination of simple correlation coefficients indicates that there are statistically significant relationships between graduate teacher trainees' perceptions of learning environment and their attitudes towards the course. It was found that three CUCEI scales, Student Cohesiveness, Innovation and Satisfaction, were significantly correlated (p<0.001) to the attitude scale Difficulty. The other scales Involvement and Personalisation were also correlated to the attitude scale Difficulty at p<0.05 level. The scale Individualisation, Innovation, Involvement and Personalisation were significantly correlated (p<0.001) with the graduate teacher trainees' attitudes towards the Speed of the course.

The multiple correlation R for the attitude scale Difficulty was found to be 0.31 and it was statistically significant at p<0.001 level. An examination of beta weights revealed that perception of Satisfaction to the course was significantly and independently associated with the attitude scale Difficulty. On the other hand, the graduate teacher trainees' perception on Individualisation was significantly and independently associated with the attitude scale Speed. The multiple correlation R was 0.39, which is statistically significant (p<0.001).

Generally, the series of r, R and b values presented in Table 2 confirmed that there were significant associations between the learning environment and attitudes in this tertiary learning context.

Table 2 Associations between CUCEI Scales and Difficulty and Speed in Terms of Simple Correlations (r) and Multiple Correlation (R) and Standardised Regression Coefficient (b).

Scale	*Difficulty*		*Speed*	
	r	*b*	*r*	*b*
Student Cohesiveness	0.19**	0.07	0.03	0.11
Individualisation	0.07	0.07	0.35**	0.30**
Innovation	0.24**	0.10	0.11**	0.02
Involvement	0.18*	0.07	0.15**	0.04
Satisfaction	0.27**	0.33**	0.13*	0.48
Task Orientation	0.08	0.11	0.14*	0.07

Personalisation	0.12*	0.48	0.28**	0.17
Multiple Correlations *R*	0.31**		0.39**	
R^2	0.09		0.15	

*p<0.05, **p<0.001

Gender-related differences in graduate teacher trainees' perceptions of learning environment

Gender differences in graduate teacher trainees' perceptions of their learning environments were explored using one-way multivariate analysis of variance with the set of CUCEI scales as dependent variables. Table 3 reports the gender differences in graduate teacher trainees' perceptions of their learning environment as measured by the CUCEI. It was found that out of seven scales only Student Cohesiveness was significantly different (p<0.05).

Table 3 Scale Means and Gender Differences in Graduate Teacher Trainees' Perceptions of Learning Environment Measured by CUCEI Scales.

Scale	*Gender*	*Item Mean*	*SD*	*Mean Difference*	*t*
Student Cohesiveness	Male	17.37	3.52	1.18	2.70 *
	Female	18.55	3.80		
Individualisation	Male	17.13	2.68	0.18	0.64
	Female	16.94	2.40		
Innovation	Male	17.49	3.21	0.01	0.02
	Female	17.48	2.92		
Involvement	Male	20.87	2.42	0.36	1.28
	Female	21.23	2.38		
Personalisation	Male	20.12	2.87	0.07	0.19
	Female	20.05	2.88		
Satisfaction	Male	19.64	3.51	0.28	0.70
	Female	19.36	3.44		

Task Orientation	Male	20.89	2.34	0.46	1.78
	Female	21.35	2.12		

*p<0.05 n = 105 males and 230 females

Female graduate teacher trainees perceived that within their classroom environment, they knew each other well and maintained good friendships among themselves. This finding is hardly surprising in a teaching workforce that is female-dominated. This also appeared to corroborate with similar findings on gender differences in the classrooms. In a study by Goh and Fraser (1997), they found that at primary school level, the girls in Singapore generally viewed their classroom environments more favourably than boys. In Fisher and Rickards' (1998) study, statistically significant gender differences were detected in students' responses to classroom environment scales. They found that females perceived their teachers in a more positive way than do males.

Conclusion

It appears that the *College and University Classroom Environment Inventory* (CUCEI) to assess the learning environment in a tertiary institution in Singapore and to establish whether there was any link to attitude yielded positive results. When used in tertiary education in Singapore, each scale in the CUCEI was found to have satisfactory internal consistency reliability. These findings are significant as they supported the cross-cultural validity of the CUCEI scales when used for the first time in this learning environment context.

Significant attitude-environment associations were also found in this teacher-training learning context. This finding implies importantly that these graduate teacher trainees, having experienced positive learning environments at the NIE, would be more inclined to establishing positive learning environments in their classroom to enhance their students' learning. This definitely would reinforce the concept of effective classroom management and the need to create a positive learning environment as emphasised in their course on "Teaching and Classroom Management" Measuring learning environment with an appropriate tool will help the teacher to examine their classes and continuously improve to a productive learning environment. It will be an advantage for the teacher to use these instruments in finding out the nature of the classroom. Such information can then be used with other source of data to be aware of the changing needs of the classroom environment.

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