

## **Student Perceptions of Teacher-Student Interpersonal Behaviour and Classroom Learning Environment in Metropolitan and Country Schools**

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The Tomlinson Report (1994, p. 27) in Western Australia noted that a 'systematic difference in Tertiary Education Entrance performance favouring metropolitan over rural school students' was evident. While this report signalled the author's belief that this difference was not simply a rural versus metropolitan discrimination, it offered few possible explanations for the difference. Rural students' participation in education is lower than that of students from the metropolitan areas. This lower participation rate has been the subject of concern to governments (Dawkins & Kerin, 1989). In United States schools, metropolitan schools often are better equipped, attract better and more experienced teachers and their students tend to do better than rural school students (Baker, 1998; Ballou & Podgursky, 1995; Dayton, 1998; Reaves & Larmer, 1998).

Other studies examining academic performance measures have not revealed a lower performance by rural students (Monk & Haller, 1986; Kleinfeld, 1985; Ward & Murray, 1985) while Khattri, Riley and Kane (1997) state that geographical isolation and the imposition of an urban model of schooling in rural areas could be a factor in putting students at risk academically. These apparent differences are of concern as this can affect whether or not students undertake tertiary study. Additional factors that affect whether students proceed to higher education include achievement, motivation, school type, parental encouragement, socio-economic background, and personal values (Hemmings, Kay, & Hill, 1998; Lam, 1982; McInnes, James, & McNaught, 1995).

Young's (1994) study on the importance of school location in affecting student performance showed that it was not the school location but rather whether the student was Aboriginal or Torres Strait Islander or attended a school in a low socio-economic area (Haller & Virkler, 1993) that affected the student's performance. However, relative geographical isolation of rural schools, particularly in Western Australia, is a factor that 'limits their teachers' opportunities for professional development. This, in turn, constrains teachers' abilities' to socialise with other

professionals and to have access to current pedagogical knowledge (Reaves & Larmer, 1998). Young (in press) also investigated the effect of academic self-concept and learning environment on science and mathematics achievement in rural and remote Western Australia. She found that students' self-concept and their perceptions of their classroom learning environments were related to academic achievement. Ewington (1996), in examining Tasmanian schools, noted that urban parents perceived urban schools to be more effective than did parents of rural schools. He suggested the reason for this was the higher proportion of less experienced and more mobile teachers that are found in rural schools.

While it is true that rural schools, both in United States (Khatti, Riley, & Kane, 1997; Stem, 1994) and Australia (Productivity Commission, 1998) tend to be smaller than their metropolitan counterparts, they are seen to cultivate a positive school climate, better community-school relationships and a better learning environment (Ballou & Podgursky, 1995; Kearney, 1994; Tompkins & Deloney, 1994). One of the main reasons for this could be the intimacy of rural communities and the parental support often provided in rural schools. The result of this could be an enhanced learning environment. It was thus decided in this study to examine the learning environments of metropolitan and rural schools to see if there were any differences between them.

Research suggests that students who come from different geographical areas display a distinct culture, however, none of the above studies examined the effect of the local culture on learning. According to Phelan, Davidson, and Cao (1991), culture is the norms, values, beliefs, expectations, actions, and emotional responses of the group. While there are a number of research studies in science concerning culture and education generally (Aikenhead, 1997a, 1997b; Atwater, 1993, 1996; Cobern, 1996; Maddock, 1981), comparatively little research examines the interaction that occurs between culturally sensitive factors of students' learning environment and their learning in science. In this paper, it is argued that at the macro-classroom level, there are distinctions that can be made between the way of life (including the classrooms) for rural, provincial and metropolitan students.

This paper reports the findings from a study of 39 schools in Western Australia. While these schools were from geographically diverse locations, interesting comparisons were found between each type of school in terms of student-teacher interpersonal behaviour and students'

perceptions of culturally sensitive factors of their learning environment. A brief description is given of the development of a questionnaire to assess culturally sensitive factors of learning environments and its application in investigating relationships between these factors, teacher-student interpersonal behaviours, student attitude towards science and student achievement of enquiry skills in these schools.

### **Culturally Sensitive Factors of the Learning Environment**

The new instrument utilised in this study was based on previous learning environment scales that a review of research literature indicated could be culturally important (Fisher & Waldrup, 1997, 1999). The selection of these scales was guided further by an examination of literature from the fields of anthropology, sociology and management theory. The initial development of the instrument, named the *Cultural Learning Environment Questionnaire* (CLEQ), (Fisher & Waldrup, 1999) was guided by the following criteria:

- i. Consistency with the important learning style dimensions identified by Grashna (1972) who argued that there are three contrasting styles: dependent-independent, competitive-collaborative and avoidant-participant. Authority figures feature strongly with *Dependent* students while *Independent* students like to think and work on their own but do not mind listening to others. *Competitive* students view learning as a competitive process but *Collaborative* students prefer cooperative learning approaches. Finally, *Avoidant* students try to avoid becoming involved in the class while *Participant* students look for opportunities to socialise and interact in the class context.
- ii. Coverage of Moos' general dimensions. Scales for the CLEQ were chosen to include at least one scale from each of Moos' (1979) three dimensions. In his research on human environments, Moos (1979) found that three general categories can be used in characterising diverse learning environments. This finding emerged from Moos' work in a variety of environments including hospital wards, school classrooms, prisons, military companies, university residences and work milieus. The three dimensions are: *relationship dimensions* which identify the nature and intensity of personal relationships within the environment and assess the extent to which people are involved in the environment and support and help each other; *personal development dimensions* which assess personal growth and self-enhancement; and *system maintenance and system change dimensions* which involve the extent to which the environment is orderly, clear in expectations, maintains control, and is responsive to change.

- iii. Consistency with previous learning environment research. All relevant scales contained in relevant existing instruments designed for assessing the learning environment were examined for guidance in identifying suitable scales.
- iv. Consistency with the important cultural dimensions in the unique environment of multicultural organisations identified by Hofstede (1984). After collecting information with a detailed questionnaire from thousands of individuals working in multi-national corporations operating in 40 countries, Hofstede (1984) analysed the data and identified four dimensions of culture, namely, *Power Distance*, *Uncertainty Avoidance*, *Individualism*, and *Masculinity/Femininity*.
- v. Salience to teachers and students. By interviewing teachers and students, an attempt was made to ensure that the CLEQ's scales and individual items were considered salient by students and teachers.
- vi. Economy. In order not to consume too much valuable classroom time, the CLEQ was designed to have a relatively small number of reliable scales, each containing a small number of items.

The resulting questionnaire contained seven scales: Equity, Collaboration, Deference, Competition, Teacher Authority, Modelling, and Congruence. A description of each of these scales, together with a sample item from each is provided in Table 1.

*Table 1 Descriptive Information for each Scale of the CLEQ*

SCALES	DESCRIPTION	SAMPLE ITEM	MOOS DIMENSION	HOFSTEDE CULTURAL DIMENSION
Equity	The extent to which students perceive males and females are treated equally.	I feel that comments in class by male and female students are equally important. (+)	Relationship	Masculinity Femininity
Collaboration	The extent to which students perceive they collaborate with other students rather than act as individuals.	I feel that it is important for the class to work together as a team. (+)	Relationship	Individualism
Defence	The extent to which students feel they defer to the opinions of others.	I try to say what I think the teacher wants rather than give my own opinions. (+)	Relationship	Uncertainty Avoidance
Competition	The extent to which the students are competitive with each other.	I like to compete against the other students. (+)	Personal Development	Individualism
Teacher Authority	The extent to which students perceive the teacher has authority in the classroom.	It is OK for me to disagree with the teacher. (-)	System Maintenance & Change	Power Distance
Modelling	The extent to which the students expect to learn by a process of modelling.	I like teachers to show me what to do. (+)	Personal Development	Uncertainty Avoidance
Congruence	The extent to which the students perceive learning at school matches their learning at home.	What I learn in this class helps me at home. (+)	System Maintenance & Change	Uncertainty Avoidance

The CLEQ contains 35 items, which have been construct and content validated by teachers, students and fellow researchers. Each scale contains five items that are responded to on a five-point scale with the extreme alternatives of Disagree - Agree. Students are asked to indicate to what extent they agree that each item describe their science classroom. The CLEQ has been shown to be a valid and reliable instrument (Waldrip & Fisher, 1997, 1999). The refinement and validation of the CLEQ involved a series of factor analyses the purpose of which was to examine the internal structure of the set of 35 items. A principal components analysis with varimax rotation was used to generate orthogonal factors. The conceptual distinctions among the scales were justified by the factor analysis. Later, students were interviewed about their responses to the questionnaire so that the scale descriptors' content and construct could be verified. The

students chosen for interviews were selected so that they reflected the range of responses to the questionnaire. In this study, the CLEQ was used to examine the associations of its scales with student-interpersonal behaviours, students' attitudes to science and enquiry skills.

### **Teacher-Student Interpersonal Behaviour**

A team of researchers in The Netherlands extended classroom environment research by focusing specifically on the interpersonal behaviour between teachers and their students (Wubbels, Creton, & Hooymayers, 1985). The Dutch researchers investigated teacher interpersonal behaviour in classrooms from a systems perspective, adopting a theory on communication processes developed by Watzlawick, Beavin, and Jackson (1967). Within the systems perspective on communication, it is assumed that the behaviours of participants influence each other mutually. The behaviour of the teacher is influenced by the behaviour of the students and in turn influences student behaviour. Circular communication processes develop which not only consist of behaviour, but determine behaviour as well.

With the systems perspective in mind, Wubbels, Creton and Hooymayers (1985) developed a model to map the interpersonal behaviour of teachers and their students extrapolated from the work of Leary (1957). In the adaptation of the Leary model, teacher behaviour is mapped with a Proximity dimension (Cooperation, C - Opposition, O) and an Influence dimension (Dominance, D, - Submission, S) to form eight sectors, each describing different behaviour aspects. Wubbels, Creton, and Hooymayers (1985) labelled these sectors to describe the type of teacher interpersonal behaviour in each section. Wubbels, Creton, and Hooymayers labelled each section as: Leadership, Helping/Friendly, Understanding, Student Responsibility and Freedom, Uncertain, Dissatisfied, Admonishing and Strict behaviour.

The Questionnaire on Teacher Interaction (QTI) is based on this model and is composed of eight scales, each of six items, corresponding to the eight sectors. Table 2 clarifies further the nature of the QTI by providing a scale description and a sample item for each of the eight scales. The QTI was used to assess the interactions between students and teachers in this study.

*Table 2 Description of Scales and Sample Items for each Scale of the QTI*

SCALE NAME	DESCRIPTION OF SCALE (THE EXTENT TO WHICH THE TEACHER...)	SAMPLE ITEM
Leadership	...leads, organises, gives orders, determines procedure and structures the classroom situation.	This teacher talks enthusiastically about his/her subject.
Helpful/Friendly	...shows interest, behaves in a friendly, considerate manner and inspires confidence and trust.	This teacher helps us with our work.
Understanding	...listens with interest, empathises, shows confidence and understanding and is open with students.	This teacher trusts us.
Student Responsibility/Freedom	...gives opportunity for independent work, gives freedom and responsibility to students.	We can decide some things in this teacher's class.
Uncertain	...behaves in an uncertain manner and keeps a low profile.	This teacher seems uncertain.
Dissatisfied	...express dissatisfaction, looks unhappy, criticises and waits for silence.	This teacher gets angry unexpectedly.
Strict	...checks, maintains silence and strictly enforces the rules.	This teacher is strict.

### **Outcome Measures**

When classroom environment perceptions have been used as predictor variables, associations between student cognitive and affective outcomes and learning environment have been found. Fraser (1994) provides a broad overview of these results which indicate that classroom environment perceptions can influence students' outcomes. In keeping with this previous learning environments and learning outcomes were investigated in this study. In order to have a common cognitive achievement measure, items on enquiry skills were selected from the *Test of Enquiry Skills* (Fraser, 1979).

Until about 20 years ago, research involving science students' outcomes focussed primarily on educational objectives in the cognitive domain but, in more recent times, attention has been paid to outcomes in the affective domain; the study of student attitudes has formed a primary

component of this research (Weinburgh, 1995). Shulman & Tamir (1973) suggested that affective outcomes of education are at least as important as cognitive outcomes and acknowledgement of the importance of affective outcomes is reflected in their increasing emphasis in curricula (Gardner & Gauld, 1990; Hough & Piper, 1982; Mathews, 1974). Because of the importance of students' affective outcomes in education, and the fact that past studies frequently have reported statistically significant associations between students' perceptions of their learning environment and their affective learning outcomes (Fraser, 1998), it was decided to examine associations between students' perceptions of their teachers' behaviour, and students' attitude to their class with a seven-item Attitude to This Class scale based on selected items from the *Test of Science-Related Attitudes* [TOSRAI (Fraser, 1981)]. This scale has been used in several previous studies involving students in science classes and has been shown to have satisfactory internal consistency (e.g., Fisher & Rickards, in press; Fisher, Henderson & Fraser, 1995).

### Methodology

The overall aim of the study described in this paper was to investigate differences in students' perceptions of teacher-student interpersonal behaviour and culturally sensitive factors of the classroom learning environments in metropolitan and country schools. The first objective was to examine the differences in students' perceptions of teacher-student interpersonal behaviour and classroom learning environments in metropolitan, provincial, rural and mining town schools. The second objective was to examine associations between students' perceptions of cultural factors affecting the learning environment, student-teacher interpersonal behaviour and their attitudes and enquiry skills.

In the study, four types of communities were defined: metropolitan schools in the Perth city area; provincial towns were defined as communities outside the Perth metropolitan area with a population greater than 20,000; rural towns were generally centres which had a population base of less than 5,000; and mining towns were rural communities which were mining based and often had a largely transient population.

The sample used contained 1, 123 secondary school students in 15 metropolitan schools, 414 students in eight provincial schools, 439 students in 11 rural schools, and 102 students in five



mining town schools. All students completed a survey that included the QTI, the CLEQ, an Attitudes towards Science scale, and items on enquiry skills.

Simple correlation analyses were used to examine the degree of association between each of the CLEQ and QTI scales and attitude to science, and between the CLEQ and QTI scales and achievement of enquiry skills. Differences in CLEQ and QTI scales, attitudes and enquiry skills due to type of school were examined using a MANOVA.

## Results

### *Teacher-student interpersonal behaviours*

For this study, the alpha coefficients of the QTI scales ranged from 0.67 to 0.88. The reliability data suggests that each QTI scale has acceptable reliability, especially for scales containing a relatively small number of items. Table 3 indicates that rural students were less likely to perceive the more positive aspects of student-teacher interpersonal behaviours and more likely to perceive the more negative aspects than were students from the other types of schools. For example, rural students' perceptions of leadership and understanding were not as high as were other students' perceptions and they were more likely to perceive uncertain behaviours in their teachers. Mining students perceived the most strict behaviour and were given the least responsibility and freedom. Provincial and rural students received more responsibility and freedom. It is possible that this is because they are often in smaller classes. Metropolitan students reported the least uncertain behaviour which might reflect that metropolitan schools tend to retain more experienced teachers.

**Table 3 Means and Standard Deviations of Metropolitan, Provincial, Rural and Mining Town Students' Perceptions for QTI Scales**

SCALE	METROPOLITAN STUDENTS MEAN (s.d.)	PROVINCIAL STUDENTS MEAN (s.d.)	RURAL STUDENTS MEAN (s.d.)	MINING STUDENTS MEAN (s.d.)	NOTES
Leadership	0.69* (0.18)	0.70 (0.25)	0.64 (0.18)	0.71 (0.20)	Rural was sig less than all other types
Helpful/Friendly	0.72 (0.19)	0.74 (0.21)	0.69 (0.29)	0.74 (0.19)	
Understanding	0.72 (0.20)	0.74* (0.24)	0.69* (0.21)	0.71 (0.20)	Rural was less sig than provincial
Student Responsibility/Freedom	0.44* (0.16)	0.50* (0.16)	0.47 (0.16)	0.41 (0.16)	Metro & mining were less sig than prov & rural
Uncertain	0.25* (0.17)	0.28 (0.16)	0.30* (0.19)	0.27 (0.16)	Metro was sig less than rural
Dissatisfied	0.32 (0.20)	0.31 (0.20)	0.32 (0.21)	0.35 (0.19)	
Admonishing	0.26 (0.20)	0.21 (0.19)	0.28 (0.20)	0.28 (0.19)	
Strict	0.43 (0.16)	0.40* (0.16)	0.41* (0.15)	0.46 (0.16)	Mining was sig more than prov. & rural

\*  $P < 0.01$

\* The range for the mean is 0 - 1.

#### *Culturally sensitive factors of the learning environment*

In this study, the Cronbach alpha coefficients of the CLEQ scales were acceptable and ranged from 0.70 to 0.84 with a sample of 2,023 students in 39 schools. Table 4 shows the means for metropolitan, provincial, rural and mining town students. The means of Equity and Collaboration suggest that the students believed that the males and females were treated equally in their classes and that there was a high degree of collaborative learning occurring. The lower means for Deference, Competition and Teacher Authority suggest that students were willing to give their own opinions in class, were less likely to be driven by competition and more likely to disagree with the teacher.

An examination of Table 4 indicates that mining students were more likely to model teachers than metropolitan students, but were more likely to perceive congruence between home and school. Metropolitan students were the most competitive and significantly more so than rural students who were the least likely to be competitive. Otherwise, on a collective but not individual basis, the students in classrooms in rural, provincial, and mining towns had similar perceptions of culturally sensitive factors of the learning environment.

*Table 4 Means and Standard Deviations of Metropolitan, Provincial, Rural and Mining Town Students' Perceptions for CLEQ Scales*

Scale	Metropolitan Students Mean (s.d.)	Provincial Students Mean (s.d.)	Rural Students Mean (s.d.)	Mining Students Mean (s.d.)	Notes
Equity	4.54 (0.55)	4.60 (0.48)	4.56 (0.57)	4.63 (0.57)	
Collaboration	4.12 (0.67)	4.15 (0.69)	4.12 (0.63)	4.22 (0.63)	
Deference	3.01 (0.81)	3.03 (0.81)	3.04 (0.79)	3.23 (0.82)	
Competition	3.14* (1.06)	2.99 (0.95)	2.95* (1.01)	3.07 (0.94)	Metro was sig more than rural
Teacher Authority	2.98 (1.01)	3.02 (0.93)	3.09 (0.90)	2.91 (0.85)	
Modelling	3.09* (0.78)	3.13 (0.77)	3.13 (0.74)	3.33* (0.78)	Mining was sig more than metro
Congruence	3.46 (0.90)	3.49 (0.83)	3.43* (0.90)	3.70* (0.82)	Mining was sig more than rural

\*  $P < 0.01$

#### *Associations between CLEQ Scales and Learning Outcomes*

Past environment research has often investigated associations between student outcomes and the nature of the classroom environment (Fraser, 1994). In order to permit examination of the predictive validity (i.e., the ability to predict student outcomes) of the CLEQ, students completed a simple Likert-type questionnaire which assessed students' attitudes towards science

(Fraser, 1981) and items on enquiry skills (Fraser, 1979). Simple correlation analyses were used in examining the degree of association between each of the CLEQ scales and attitude to science and between the CLEQ scales and achievement of enquiry skills. Overall, as depicted in Table 5, most of the scales of the CLEQ were found to be associated with students' attitudes and achievement of enquiry skills. Furthermore, it can be seen that all of the significant correlations were positive except for two cases in which greater levels of perceived Deference were associated with lower scores on attitude towards science and greater levels of Teacher Authority were associated with lower scores on enquiry skills. The highest correlations occurred with attitudes to science when students perceived greater levels of Congruence and Equity in their classrooms. These two scales were also important for the achievement of enquiry skills.

*Table 5 Student Outcomes - Simple and Multiple Correlation between Attitudes, Enquiry Skills and CLEQ Scales (#  $p < 0.05$  \*  $p < 0.01$ )*

CLEQ Scale	Unit of Analysis	Simple Correlation (r)		Standardised Regression Weight (B)	
		Attitudes	Enquiry Skills	Attitudes	Enquiry Skills
Equity	Individual	.20 *	.17 *	.14 *	.16 *
	Class	.25 *	.39 *	.16 *	.41 *
Collaboration	Individual	.04 *	-.01	.00	-.04 #
	Class	.02	-.14	-.10	-.19 *
Teacher Authority	Individual	.00	-.12 *	-.04 #	-.13 *
	Class	.07	-.32 *	.01	-.26 *
Competition	Individual	.13 *	.04 #	.14 *	.09 *
	Class	.26 *	.08	.23 *	.13 #
Deference	Individual	-.12 *	.02	-.12	.01
	Class	-.05	.13	-.04	.03
Modelling	Individual	-.09 *	-.09 *	.15 *	-.07 *
	Class	.07	-.09	-.21 *	.06
Congruence	Individual	.30 #	.06	.28 *	.05 *
	Class	.42 *	.03	.40 *	.03
Multiple Correlation, R	Individual			.39 *	.24 *
	Class			.54 *	.53 *

These associations were further investigated using multiple regression. The magnitude and statistical significance of the regression coefficient provides a measure of the association between the outcomes and input variable when scores on the other input variables are held constant. Beta weights and significance levels are reported in Table 5 for each CLEQ scale and there is a high degree of congruence with the results of the simple correlations. Table 5 shows that the number of significant regression weights for the multiple correlation analysis was six for attitudes and seven for enquiry skills. An examination of the signs of the significant beta weights reveals that the regression weight for attitudes was positive for Equity, Competition and Congruence and negative for Deference and Modelling. The regression weight for enquiry skills is positive for Equity, Competition, Deference and Congruence and negative for Teacher Authority and Modelling.

Table 6 indicates that students' attitudes to science in rural schools are significantly less than those of students in metropolitan and provincial schools. No significant differences were found with enquiry skills. This result is similar to previous research (Monk & Haller, 1986; Kleinfeld, et al., 1985; Ward & Murray, 1985).

*Table 6 Means and Standard Deviations of Metropolitan, Provincial, Rural and Mining Town Students' Attitudes towards Science and Enquiry Skills*

	Metropolitan Students Mean (s.d.)	Provincial Students Mean (s.d.)	Rural Students Mean (s.d.)	Mining, Students Mean (s.d.)
Attitudes towards	3.50*	3.47*	3.29*	3.35
Science	(0.47)	(0.74)	(0.74)	(0.71)
Enquiry Skills	7.04 (1.82)	7.09 (1.88)	7.01 (1.84)	6.58 (2.07)

\*  $P < 0.01$

Notes: Rural was sig. less than metro. & prov.

## Discussion

This article has described metropolitan, provincial, rural and mining town students' perceptions of culturally sensitive factors affecting their learning environment and teacher-student interpersonal relationships. It builds on a previous study which described the development and validation of a questionnaire, namely the Cultural Learning Environment Questionnaire (CLEQ), which assesses seven scales of the culturally sensitive factors of the learning environments of secondary school science students (Fisher & Waldrip, 1999). The CLEQ was found to be a reliable and valid instrument for use with metropolitan, provincial, rural, and mining town students.

While some aspects of the learning environment were similar, differences were found between the students from metropolitan, provincial, rural and mining areas. Mining town students were more likely to defer, model learning methods and see congruence between what was learned at home and in school. Mining students had a distinctly different perception of teacher-student interpersonal behaviours. Some of these aspects could be due to the generally more transient nature of mining area populations. Rural students were less likely to report the more positive aspects of student-teacher interpersonal behaviours and were more likely to report the negative aspects.

Associations between students' culturally sensitive learning environment and their attitudes and enquiry skills were found. Regression analysis suggested that more positive student attitudes are associated with more Equity, Competition, Congruence and less Deference and Modelling. The development of student enquiry skills is associated with more Equity, Competition, Risk Involvement, Congruence and less Modelling. It is apparent that highly structured lessons which encourage students to model exactly what they have been shown are associated with lower students' attitudes towards science and achievement of enquiry skills. No differences in enquiry skills due to school type were reported.

This study is significant in that it shows that differences in teacher-student interpersonal behaviour and students' perceptions of cultural factors affecting the learning environment exist between metropolitan, provincial, rural and mining town students. A previous study (Young, in press) has shown that students' perceptions of the learning environment do affect their academic

achievement. This study shows that classroom differences do exist between the locations of schools and that these differences are related to student-teacher interpersonal behaviour and culturally sensitive factors of the classroom learning environment.

This paper has provided information on what differences occur between metropolitan and country schools rather than why they occur. However, where there are such differences between schools, the achievement of students will most likely differ. These issues would be a worthwhile focus for future research.

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