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Student Perceptions of Science Teacher Communication Behavior in Jordan

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Abstract

The purpose of this study was to determine student perceptions of science teacher communication behavior in the classroom environment in Jordan. A total of 1,093 participants in the study completed the Teacher Communication Behavior Questionnaire (TCBQ). Results indicated the overall mean of teacher communication behavior to be 3.9 and showed statistically significant differences in gender perceptions on all five scales of the TCBQ. Results also showed statistically significant differences in student perceptions of teacher behavior in biology, physics and mathematics classes on all five scales of the teacher communication behavior.

Keywords: *teacher communication, student perceptions, gender differences, subject differences*

Introduction

Good and Brophy's study (1991), commenting on the rapidly occurring classroom interactions between the teacher and students, indicated that in a single day secondary school teachers may be interacting with as many as150 different students. It is not surprising, therefore, to find that in general, teachers are unaware or unable to remember or describe what happens in these teacher-student interactions. After conducting interviews with teachers, the researchers confirmed that

teachers were not only unaware of the number of questions they had asked their students, but were also unable to remember the kind of feedback they provided. Thus, identifying and recording teacher-student interactions could be beneficial to classroom teaching.

Regarding the study of teacher-student relationships as part of the broad research area of classroom learning environments, research has predominantly been based on the work of Wubbels (Wubbels & Brekelmans, 2005; Wubbels & Levy, 1991; Wubbels, Levy & Brekelmans, 1997), while Watzlawick, Beavin & Jackson (1991) noted that Wubbels' interest in teacher-student relationships was from the systems theory perspective. The systems theory highlights the links between a group of people and response/reaction mechanisms by which they are mutually influenced.

Since a system is influenced by change in one aspect causing changes in other aspects, social situations are defined as systems. Therefore, the systems perspective in the education environment temples a non-unidirectional teacher-student relationship whereby the behaviors of each exert a mutual effect, partially determining and being determined by the other.

Using classroom learning environment dimensions as independent variables (e.g., type of school, grade level, size of class, and subject matter) researchers have studied a wide range of varied classroom environments.

In Asia, for example, the most widely studied effect is that of student gender (Fraser, 2002), results indicating that girls tend to perceive their learning environments more positively than boys (a). While the results of the studies by Fraser, Giddings & McRobbie (1995); Khine & Fisher(2003); and She & Fisher (2002) illustrated higher levels for encouragement and praise (b). Frumkin (2006) and Frumkin & Murphy (2007) report more positive perceptions of all of the five TCBQ factors (c). The results of the studies by Özay, Kaya & Sezek (2004); Yilmaz Tüzün (2006) showed student perception of their teachers as giving more encouragement and praise, being more understanding, and exhibiting more friendliness (d).

The discrepancy in student gender perceptions of teachers is clearly illustrated in a study by Yilmaz Tüzün (2006), showing sharply contrasting results with male students describing their teachers as controlling.

According to Fraser (2002), evidence of positive associations was found between students' cognitive learning outcomes and classroom learning environment perceptions, with subject matter, as expected, playing an important role in influencing student perceptions. These results are commented on by Özay et al. (2004); She (1998); She & Fisher (2002), reasoning that the more positive perception of biology teachers as opposed to those teaching physics may be explained by the commonly

held view that not only is biology considered an easier subject than physics, but it is generally being taught in a less strictly traditional way.

As stated by Fisher & Rickards (1997) and Wubbels & Lev (1993), student learning is influenced by the effect of mutual behavioral impact between science teachers and students, as is the case with teachers of other courses. Realizing the necessity of helping teachers to regulate their classroom behaviors and exert the necessary effort in creating a favorable and learning-conducive classroom environment, She and Fisher (2000) developed the Teacher Communication Behavior Questionnaire (TCBQ), designed to measure student perceptions of classroom communication patterns.

Walberg (1984) noted that student achievement was impacted on by teacher behavior, while a study by Van Tartwijk (1993) found an important factor not only in teacher verbal behavior, but also in the crucial role of facial expressions which, he concluded, regulated most classroom events. Carlsen (1991), Smith, Blakeslee, & Anderson (1993) came to the conclusion that the most important dimensions in teacher-student communication in the classroom environment were the teacher's methods of asking questions and their subsequent reaction and response to the student's answers.

Study Purpose

To my knowledge, no study has attempted to determine student perceptions of science teacher communication behavior in Jordan. The objectives of the presented study were to:

1. Determine student perceptions of science teachers' communication behaviors.
2. Determine if there are any gender differences in student perceptions of their science teachers' communication behaviors.
3. Determine if there is any difference in student perceptions of their science teachers' communication behaviors, relative to the science subject.

Methodology

Participants

The study was conducted between September 5, 2015 and December 20, 2015. Participants were 1,093 male and female students from 33 schools in Al-Zarqa city,

Jordan. Gender distribution: the sample comprised 585(54%) male and 508 (46%) female students; grade distribution: 376 (34%) 8th, 335 (30%) 9th, and 382 (36%) 10th grade. The average age of the participants was M=15.5, SD= 0.82.

Instrument

Teacher Communication Behavior Questionnaire (TCBQ)

The TCBQ was developed by She & Fisher (2002). The questionnaire is composed of 40 items and five scales: challenging (8 items, e.g., this teacher asks questions that require me to use a judgment to answer), encouragement and praise (8 items, e.g., this teacher praises my answers), non-verbal support (8 items), understanding and friendly (8 items, e.g., this teacher cares about me), and controlling (8 items, e.g., this teacher demands that I listen to instructions). The students respond on a 5-point frequency scale: 1= almost never, 2= seldom, 3= sometimes, 4= often, and 5= very often.

For the purpose of the present study, the TCBQ was translated from English to Arabic for use in Jordan, following the back translation procedure. This is a commonly used procedure to evaluate the quality of a translation, a method verified by Harkness & Schoua-Glusberg (1998).

Two faculty members translated the English TCBQ into Arabic and back translations into English were performed independently by two faculty members not involved in the original translation. Based on the results of the back-translation, some modifications were made to the wording of the items in the Arabic version to match more closely the functional meaning of the English version.

In the present study, the reliability coefficient calculated using the Cronbach alpha was found to be 0.84, 0.87, 0.90, 0.89 and 0.83 respectively for challenging, encouragement and praise, non-verbal support, understanding & friendly, and controlling.

Procedure

The purpose and procedures for answering the questionnaire were explained to the participants and administered in the normal classroom environment. The participants were instructed to answer all the items on the questionnaire and reminded to maintain orderly behavior during its administration, which would take approximately 25 minutes. The participants were also informed that there were no right or wrong answers and assured that their responses would be kept strictly confidential and used solely for the purpose of the study. Statistical analysis

included descriptive statistics, means and standard deviations, an independent sample t-test was used to determine gender differences in student perceptions of their science teachers' communication behaviors, while Duncan multiple range tests were used to determine differences between the behaviors of teachers of the different science subjects.

Results

The results of the study are addressed by objectives.

Objective One

Objective one was to determine the level of student perceptions of science teachers' communication behaviors. Descriptive statistics, including means and standard deviations, were used to achieve this objective. Analysis of the data in the first questions involved the tabulation of the mean of student perceptions of science teachers' communication behaviors. The total mean score was calculated based on the students' responses to each item in the TCBQ using the 5-point Likert-type scale. Thus, the levels of the students' perceptions were interpreted as follows: below 3=low, 3–4=medium, and over 4=high.

As illustrated in Table 1, the mean for Challenging was 4.02, Encouragement and praise 3.73, non-verbal support 3.76, understanding and friendly 4.15, and controlling 3.92, resulting in an overall mean of 3.91 for teacher communication behavior.

Table1. Descriptive statistics Means (M) and Standard Deviations (SD) for all the variables

Variables	M	SD
Teacher communication behavior	3.91	0.65
Challenging	4.02	0.74
Encouragement and praise	3.73	0.86
Non-verbal support	3.76	0.91
Understanding & friendly	4.15	0.86
Controlling	3.92	0.78

Objective Two

Objective two was to determine if there were any gender differences in the students' perceptions of their science teachers' communication behaviors. The differences in mean scores of each scale item relative to the students' gender are indicated in Table 2. T-test determined statistically significant differences between the boys' and girls' perceptions on all the five scales of the TCBQ.

Table 2. Gender differences in mean scores for each scale item of the TCBQ

Scale	Male		Female		t-test	Sig
	Mean	SD	Mean	SD		
Challenging	4.24	0.61	3.75	0.79	11.336	0.00*
Encouragement and praise	3.93	0.69	3.49	0.98	8.532	0.00*
Non-verbal support	3.92	0.79	3.56	1.00	6.558	0.00*
Understanding & friendly	4.41	0.65	3.82	0.96	11.932	0.00*
Controlling	4.08	0.72	3.72	0.80	7.886	0.00*

Objective Three

Objective three was to determine if there were any differences in the students' perceptions of communication behaviors between their biology, physics, and mathematics teachers.

As presented in Table 3, statistically significant differences in teacher communication were found between the biology, physics, and mathematics classrooms on all five scales of TCBQ.

Table 3. Duncan multiple range tests of science subject differences in item mean scores for each scale of the TCBQ

Scale subject	Challenging	Encouragement and praise	Non-verbal support	Understanding & friendly	Controlling
Biology	4.14a*	3.81b	3.91b	4.30a*	4.02b
Physics	3.88c	3.54a*	3.60a*	3.90b	3.84a*
Mathematics	4.00b*	3.81b	3.72a*	4.19a*	3.87a*

Discussion

Analysis of the results of the TCBQ administered to a broad sample of 1,093 male and female students from 8th, 9th,and 10th grades in government schools in Jordan showed that the boys perceived their teachers as being more challenging, understanding and friendly, and controlling, as well as giving more encouragement and non-verbal support, than the girls did.

Thus, the boys' perceptions of teacher communication behaviors were generally more favorable than those of the girls.

These results were contrary to those found by some international studies (Fraser et al., 1995; She & Fisher, 2002; Khine & Fisher, 2003), which showed girls' perceptions of teacher behavior in the classroom as being more positive than those of boys.

This is an encouraging result from the perspective of the professional development of teachers as well as the availability of effective schooling for learners, which should not be limited by demographic location.

In the presented study, the researcher found that biology teachers were perceived as demonstrating more controlling behavior than physics teachers and thus, since the higher the factor score the more positive the perceptions, the biology students perceived their learning environment more positively than the physics students did. Perceiving the teacher's behavior as controlling indicates his/her ability to explain rules or instructions clearly and regulate the classroom behavior of the students.

This more positive perception of biology teachers in comparison with physics teachers reiterates the findings of previous international studies including those by Özay et al. (2004) and She & Fisher (2002).

This generalized discrepancy between student perceptions of their biology and physics teachers may possibly be due to the biology syllabus content considered as having greater relevance to the daily lives of students, in addition to the availability of a wider variety of biology teaching methods and resources than those traditionally employed in the physics and mathematics classrooms. The perception of the biology students regarding their classroom environment was therefore more favorable than that of the physics students.

In their study, Wubbels, Brekelmans & Hooymayers (1991) found the most important variable in explaining differences in student appreciation of both physics as a subject and of the lessons being taught at the class level was the communication style of the physics teachers. In view of the importance of this variable, which had frequently been cited in recurrent reports of statistically significant

associations between student perceptions of their learning environment and their affective learning outcomes, it was deemed necessary (Fraser, 1998b) that a study of the associations between student perceptions of their teachers' behaviors and student attitudes to their classes should be undertaken.

The subsequent development of both teacher and student versions of the TCBQ, therefore, augmented the resource instruments available to teachers, with its use in science classrooms expanding information regarding teacher/student relationships. The information provided by the dual TCBQ can provide the concerned teacher with the means of discovering the meanings of and reasons for differences between the teachers' and students' perceptions. By careful examination and reflection on individual student responses, the teacher can reach an understanding of the reasons for them and act accordingly, only in this way will teachers be able to modify their behavior and truly understand the interaction between them and their students.

Using a questionnaire like TCBQ can help identify types of teacher behavior and facilitate improvement, so using this information could help science teachers promote a classroom atmosphere of positive interaction and thereby increase student enthusiasm and improve the level of student learning and achievement in the sciences.

Recommendations

Following the results of the present study, the researcher suggests implications for the application of the TCBQ in the following fields: to aid improvement in classroom practices, in personnel development, and in future research. For instance, the TCBQ can be a useful tool in the observation and assessment of teacher classroom skills, while the questionnaire can be used to provide sensitivity training for average and controlling teachers. Using the TCBQ in this way provides a less direct and intrusive method of assessment while providing specific indications of areas needing redress. The identification and implementation of such adjustments should result in an increase in the overall quality of the classroom environment and improve the level of student engagement in the classroom. It is therefore hoped and anticipated that these suggestions may result in the promotion of an atmosphere of positive interaction in the science classrooms and an improvement in student learning.

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