

# Classroom Goal Structure in the Learning of Mathematics<sup>1</sup>

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## Abstract

According to achievement goal theory, classroom learning environment or contextual factors influence students' learning. For instance, classroom that promotes mastery learning may cultivate or inculcate task-focused goals among students. However, classroom that focuses too much on competition may encourage performance goal. Studies on classroom goal structure have focused on the relationship between the purpose or meaning of achievement behaviour that is communicated to (by teachers) and perceived (by students) and a variety of student beliefs and behaviours.

The objective of this paper is to examine students' perception of classroom goal structure or orientation as communicated by their teachers. This study on 1849 adolescents (900 males and 949 females) from 30 secondary schools in the northern state of the country found them to be more task-focused (promoting mastery learning) than performance focused. There were differences in the two dimensions of classroom goal structure in terms of some selected independent variables. The findings of the study bear some implications for theory and practice.

## Introduction

Goal structures refer to messages in the environment (eg. experimental situation, classroom, school) that make certain goals salient. Most researchers who have discussed goal structures have referred specifically to the classroom or school level goal structures (Ames, 1992; Anderman & Midgley, 1997; Urdan, Kneisel & Mason, 1999). These researchers argued that instructional policies and practices at the school or classroom level make mastery or performance goals salient. Research on classroom goal structure is both rare and new.

Teachers, either consciously or unconsciously, motivate their students by conveying many messages about the purposes for achievement behaviours (Midgley,

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1993). One message that may be communicated to students is that demonstrating ability and outperforming others are the reasons for engaging in academic behaviour (performance goal structure). Another message may be that understanding, intellectual development and improvement are reasons for engaging in academic behaviour (mastery or task goal structure). When the emphasis is on relative ability and competition, students may find ways to demonstrate that they are more able than others, or at least to demonstrate that they are not less able than others. When the emphasis is on learning, understanding, and intellectual development, students are less likely to feel threatened. Some students may perceive a high emphasis on both goals in the classroom, other students may perceive their teachers conveying more emphasis on one goal than another, or low emphasis on both goals.

Studies on classroom goal structure has focused on the relationship between the purpose or meaning of achievement behaviour that is communicated to (by teachers) and perceived (by students) and a variety of student beliefs and behaviours (eg. Ames, 1992). The classroom goal structure is communicated to students in many ways: via the types of academic tasks that are given, how children are recognized and evaluated, and how they are encouraged to do their work (Ames, 1992; Midgley, 1993). Thus, perceiving on task-focused goals in the classroom and teachers' reports of task-focused approaches to learning are expected to be associated with lower levels of avoidance of help-seeking in the classroom. In contrast, students' perceptions of an emphasis on performance and evaluation are expected to be associated with greater avoidance of help-seeking. Therefore, it is likely that the social climate of the classroom influences students' help-seeking behaviour (Newman & Schwager, 1992; Ryan & Pintrich, 1998). Students need to feel empowered and to perceive that they are in control of their learning. Therefore, a classroom goal structure characterized as caring, supportive, and friendly are likely to make students feel more comfortable interacting with the teacher and other students in order to facilitate help-seeking behaviour (Ryan, Gheen & Midgley, 1998; Turner et al., 2002).

In fact, a number of studies support the view that the classroom environment can provide the structure and support to encourage (or impede) self-regulatory behaviours (Deci, Vallerand, Pelletier & Ryan, 1991; McCaslin & Good, 1992). There are

suggestions that classroom goal structure strive for multiple goals which emphasize the task-focused goals, while at the same time seek to adapt and adopt the constructive and positive aspects of performance goals. Classroom goal structure should therefore strive to promote task focused goals among students.

Most of the research examining classroom and school goal structures employed survey methodology (Anderman, 1999; Urdan et al., 1998). Other research on classroom goal structures relied on students' reports of their perceptions on teacher classroom practices (Anderman et al., 2001). A few studies have included teacher reports of their instructional practices which were later classified by researchers as reflecting mastery or performance oriented practices (Anderman et al., 2001). Some researchers have used observation methods on teachers in the classroom (Meece, 1991; Patrick et al., 2001). There are yet other studies that employed several methods or multimethod approach to gather information on classroom goal structure (Turner et al., 2002).

Primarily, results of research on the topic showed classrooms that promote mastery of skills inculcate task-focused goals among students. On the other hand, classrooms that give more emphasis on competition result in the students who give more priority on ability.

The objective of this paper is to examine students' perceptions of classroom goal structure in the mathematics classroom, as communicated by their teachers. In addition, classroom goal structure is examined in terms of some selected independent variables, namely gender, class, and school location.

### **Method**

A multistage cluster sampling procedure was used for the selection of schools. Based on the listing of secondary schools in Kedah, five out of eleven school districts were selected. These districts were selected to reflect the different levels of economic development and accessibility in Kedah. The sampling frames were stratified by grouping the lists of schools according to urban-rural location. Due to financial and time constraints, the survey covered only 30 schools. The schools were requested to provide a sample of 30 students who were studying mathematics from each form – two and four. The sample came from mixed levels of ability.

Items for classroom goal structure were adapted from the Patterns of Adaptive Learning Survey (PALS) by Midgley and colleagues (1997) at University of Michigan. The scales in PALS were developed during an 8-year period and tested with several different samples of young and middle adolescents from various ethnic and socioeconomic backgrounds. The scale measuring students' perceptions of the classroom as emphasizing task goals asked about teachers' emphasis on understanding rather than memorization, exploring new ideas, and viewing mistakes as part of learning. The scale measuring students' perception of the classroom as emphasizing ability goals asked about teachers' emphasis on social comparison and evaluation, pointing out students who do well and those who do poorly. Permission to use the instrument was granted by all authors. The items focus on the domain of mathematics. The original scale used a 5-point Likert-type scale of response. However, to avoid the middle point response we modified the response to a 6-point forced choice Likert-type scale ranging from 1 = Strongly Disagree to 6 = Strongly Agree. A score of 3 and below indicates a tendency to disagree and a score above 3 indicates an inclination to agree with the statement.

The items were initially translated by the researchers into the Malay language, using the back-translation procedures suggested by Brislin (1970, 1980). The Malay translation was then checked by several senior Malay Language lecturers at the School of Cognitive Sciences and Education, Universiti Utara Malaysia. A back-translation of the Malay version into English was made by three bilingual English as Second Language (ESL) lecturers in the same school.

Pilot study was carried out in February 2001 on 143 form four students from two schools in Kedah. The internal consistency estimates (coefficient alpha) for classroom task goal was 0.64 and for classroom performance goal was 0.68, which was acceptable (reported as 0.77 and 0.66 respectively by Kaplan & Midgley, 1999). The scales' internal consistency reliability coefficients are comparable to the English version in previous studies. Tests for validity using factor analysis yielded the two dimensions of classroom goal structure, with factor loadings between 0.48 and 0.75.

## Results

### Profile of Respondents

Altogether, 1849 students became the respondents for the study. More than half (52.8%) were from two students. The age distribution ranged from 13 to 17 years. In terms of gender, there were slightly more female students. Since the study was carried out in a state with a predominant Malay population, it was therefore not surprising to find that a large majority (78.4%) were Malays, followed by 12.5% Chinese, 8.4% Indians and a very small minority (0.7%) who belonged to the Other ethnic group. Altogether, 1849 students became the respondents for the study. More than half (52.8%) were from two students.

### Perception Toward Math Ability

In terms of math ability, almost half (44%) of the respondents perceived themselves to be quite good at math, with another 28.7% rating themselves as being good in this school subject. Almost one fourth rated themselves as being weak in math, and only a small minority (4.4%) evaluated themselves as being excellent. The overall mean score for math ability was 4.08 (out of 6), suggesting fair ability in this school subject.

### Attitude Toward Math

Respondents were asked whether they liked math as a school subject. A large majority (62.6%) said they liked math, while 29.5% reported as liking it very much. Another 6.6% said they disliked math, while the remaining 1.3% hated it very much.

### Overall Classroom Goal Structure

As mentioned earlier, classroom goal structure refers to students' perception of the purposes for engaging in academic work that is emphasized in the classroom. The mean score for task goal structure was higher ( $M = 4.98$  and  $SD = .64$ ) than that of performance goal structure ( $M = 4.37$  and  $SD = .87$ ). The results suggest that students perceived their teacher as giving more focus on understanding ideas and concepts rather than demonstrating competence relative to others.

## Descriptive Statistics for Classroom Task Goal Structure

Five items comprised the classroom goal structure. These items refer to students' perception that the purpose of engaging in academic work in the classroom is to understand new ideas, develop new skills, learn from errors, and experience enjoyment. The descriptive statistics for these five items can be seen in Table 1.

**Table 1: Descriptive Statistics for the Classroom Task Goal Structure Items**

Item	Mean	SD
1. Our teacher thinks mistakes are okay as long as we are learning	5.21	.93
2. Our teacher wants us to understand our work, not just memorizing it.	5.18	1.00
3. Our teacher really wants us to enjoy learning new things.	5.02	.94
4. Our teacher recognizes us for trying hard.	4.76	1.01
5. Our teacher gives us time to really explore and understand new ideas.	4.69	1.10

When the six cells are collapsed into two, giving just a true and untrue category for all five items, the results showed an overwhelming majority of teachers (95.4%) in the study wanted their students to understand their work, not just memorizing. This was followed by 93.8% of them who felt they it was alright for students to make mistakes as long as they were learning. Finally, 88% of teachers gave their students time to really explore and understand new ideas.

The descriptive statistics for the classroom performance goal structure can be seen in Table 2. Based on the frequency distribution, an overwhelming majority (87.3%) of these math teachers let the class know which student obtained the highest score in the test. This was followed by 82.6% who pointed out those students who get good grades as an example to the rest of the class. Lastly, 62.4% of these teachers would tell the students how they compared with their peers.

**Table 2: Descriptive Statistics for the Classroom Performance Goal Structure Items**

Item	Mean	SD
1. Our teacher lets us know which students get the highest scores on the test.	4.86	1.10
2. Our teacher points out those students who get good grades as an example to all of us.	4.36	1.30
3. Our teacher makes it obvious when students are not doing well on their work.	4.10	1.37
4. Our teacher tells us how we compare to other students	3.78	1.42

**Classroom Goal Structure by Gender**

Based on the mean score ( $M = 5.04$ ;  $SD = .62$ ), female students seemed to be more task focused compared to males ( $M = 4.90$ ;  $SD = .66$ ). The difference in the mean scores was statistically significant ( $t = 4.63$ ;  $sig. < .00$ ).

Even though the mean score for performance goal structure was higher for female students ( $M = 4.40$ ;  $SD = .88$  versus  $M = 4.34$ ;  $SD = .86$  for male students), the difference in the mean score for both groups of students was not significantly different.

**Classroom Goal Structure by Location**

Results of t-test for task focused goal structure by location did not show significant difference according to locality of school. However, rural classrooms seemed to be more performance focused.

**Classroom Goal Structure by Form**

Results of t-test for both dimensions of classroom goal structure was significant in terms of form. Form four students seemed to be more task focused ( $t = -2.20$ ), while form two students to be more performance focused ( $t = 2.09$ ).

**Discussion and Implications**

Math teachers in this study were found to be giving emphasis on both performance and mastery learning goals in their classrooms. However, more of them were perceived to be more task oriented, which is good.

Female students perceived their teachers to be more task focused. At a time when the performance of girls is higher than that of boys, this could be one of the reasons why girls perform better than boys. Or, it could also suggest that girls are more patient and persistent to be engaged longer in learning.

Rural children in this study perceived their math teachers to be more performance focused. Did the data suggest that teachers in rural schools gave more emphasis on ability rather than mastery? Could this also mean that this was perceived to be a better method for rural teachers to motivate their students by more frequent mention of grades and evaluation? More information is needed to provide a better insight into this phenomenon.

Finally, the findings of the study showed the younger group of students (form two) were more performance focused, suggesting its' importance to their ego development and self-esteem. The older students, namely form four students seemed to be more task focused, suggesting they were more matured cognitively.

The implication of the findings of the study is that classroom context that emphasizes performance relative ability of students may highlight negative judgment for help-seeking, especially among those performance and low ability students. Both experimental and survey research has shown that students are less likely to seek help under performance goal conditions than under mastery goal conditions (Ryan et al., 1998).

If espousing a task goal orientation is associated with positive learning outcomes for students, how can schools foster such orientation? Among the suggestions forwarded by experts in the field (eg. Midgley & Urdan, 1995) are that teachers should consider moving away from competition between students through contests with limited winners, and consider moving toward cooperative learning. They should also move away from normative grading and public display of grades to grading for progress or improvement, which is more criterion referenced. In doing this, teachers can inculcate intrinsic value through mastery learning. If we need our students to be actively engaged in learning, we should consider how cognitive, motivational and social factors interact to produce effective learning.

Research also indicates that some learning environments are better suited than others for the needs and well-being of students (Ames, 1992; Anderman, 1999). It has



also been suggested that achievement or mastery goals that students perceive as emphasized in the learning environment are related to their academic and general well-being (Ames & Archer, 1988). A perceived emphasis on demonstrating ability and social comparison (performance goal structure) may be stressful to students and has been found to be associated with negative affects such as being afraid to make mistakes publicly, feeling nervous about performing in front of others, and feeling embarrassed in school. On the other hand, a perceived emphasis on mastery and understanding (task goal structure) may provide opportunities for growth and associated with positive outcomes such as improved academic efficacy (Ames & Archer, 1988). Other students reported liking the class more than did students who perceived an ability goal structure in the classroom environment. Students also reported having more feelings of belonging in the school (Roeser et al., 1996).

The limitation of this research was that it focused only on the math classroom. The authors feel that it is also important to examine classroom goal structure in other subject domains. Furthermore, our participants were from two and four students. On the basis of other research, it is possible that the findings would have been different if measured primary schools. What is also implied here is the need to use classroom observation and interviews with teachers in future research on the topic.

In conclusion, it can be said that motivational climate or classroom goal structure created by teachers play an important part in influencing students' motivation and behaviour in the classroom. The type of goal structure created affects students' beliefs and cognitive processes, to make them engaged in either adaptive or avoidance help-seeking behaviour, to be stressful or otherwise, and to have the feeling of belongingness or not to the school.

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