# TEACHER DOMINATION AND STUDENT RETARDATION

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## Background

This study materialised due to the repeated negative views received from tertiary level students in Mathematics about investigative or explorative teaching strategies, which some lecturers used in teaching. These students claimed that all through their schooling, covering twelve or more years, they were taught through a receptive model and it was too late to adapt to new teaching strategies. They were trained to become secondary school mathematics teachers and the said institution was the only one in the country that prepared secondary school mathematics teachers. Therefore, it was imperative to expose them to teaching strategies that can make mathematics interesting as well as challenging to the learners. The best way to introduce any teaching strategy is by teaching through that strategy rather than preaching about it which was one of the reasons for using the approaches different from lecture method at the tertiary level by the author and some others, which was initially resisted by the students. In addition to the information provided by the students, different groups of students on peer teaching used mainly lecture mode, which sort of confirmed the students' claim about the teaching they have had over the years.

In order to introduce positive changes in anything, one needs to be familiar with it; teaching is no different. There are different ways that can be used to obtain first hand objective information about teaching and direct observation; using a low inference observation instrument as well as video taping are two of these ways.

As direct observation is more economical than video taping, it was decided to use this as the mode of data collection. Primary school was selected due to the fact that majority of the population in the island start their formal schooling at the primary school level where the foundation for learning is laid which makes this stage of schooling vital.

## Design and Procedure

The study was to be conducted in two phases where the first phase was for fact finding and based on the results, the second phase was for training followed by post training evaluation.

i. Sample

Permission was sought from two of the primary schools, which had a number of streams for each of the grades. Grades 4 to 6 that use English as the medium of instruction were identified as the sample grades for the study. At the primary school level there are no specialist teachers, which means that one teacher who is in charge of the grade teaches all the subjects. Therefore all the teachers teaching Grades 4 to 6 in the two schools and their students formed the sample for the study.

In 1997, when the study started in School 1, Grade 6 was about to sit for the public examination, so this Grade was dropped from the sample. In School 2, all the Grades 4 to 6 and in School 3, which was a top up school, which was added in 1998, Grades 4 to 8 were involved in the study.

All together, 27 teachers, spread across Grades 4 to 8, and their students, in three schools formed the sample for the study.

ii. Data Collection

In direct observation of lessons as well as in video taping, the presence of an outsider or camera sort of intimidates the teachers. This made it necessary to brief, first the head teachers of the schools and then the sample teachers about the purpose as well as the

procedure of the study. There was a pre-observation conference, where printed copies of the purpose and the procedure of the study were distributed to the teachers to study and clarify any doubts. In a classroom observation study, it is very essential to develop rapport with the teachers, which was achieved through a pre-observation conference and follow-up sessions where the teachers were encouraged to express their concerns about observation and or video taping, as the case may be.

In 1997, at least two lessons of each of the teachers in schools 1 and 2 were observed and coded. Due to administrative problems, in these schools, feedback and training did not take place.

In 1998, at the request of the headmaster of a private school, Phase 1 was conducted in School 3 where the lessons were video taped with simultaneous coding.

In all the schools, students were given a post observation test, on topics already covered. The aim of this was to assess the students' ability to apply concepts learned in novel situations.

In school 3, the videotaped lessons were played back to the teachers for self- as well as peer-evaluation. During this time, they were to identify the areas of teaching that need to be improved.

iii. Instruments

**a. Observation Instrument**

This is a modified form of the Five minute Interaction (FMI) form, which was one of the instruments used for the Classroom Environment Study (CES) conducted by the International Association for the Evaluation of Educational Achievement (IEA).

This is a low inference instrument and the focus of this is the teacher hence the choice. The instrument had been modified and revalidated by the author over the years, to cater for the types of classroom-interactions in developing country situations.

The FMI has three major sections, namely "who to whom", "what" and "qualifier".

The section "who to whom" captures information on who initiates the interactions and to whom it is directed.

The second section, "What" gathers data on the type of interaction while the "qualifier" as the name implies, qualifies the interactions in terms of the importance given to it by the teacher.

Each of the major sections is further subdivided to cater for specific types of interactions. The section, "Who to Whom", has four while "What" has five subdivisions. The subdivisions under "What" are further subdivided into 28 specific interactions.

**b. Codes, meaning of codes and coding procedure**

b.i. Who To Whom

This section has four categories namely TG, TS, GT and ST.

The letters T, G and S stand for teacher, group or class and student.

When the teacher is giving information to the students, the interaction is initiated by the teacher (T) and it is directed to the class (G). If the teacher directs the question to a student (S) then, it is TS. Suppose the class calls out an answer to the question, the code is GT. An individual student's answer to the teacher is coded ST.

b.ii. What

This section is subdivided into five categories as instruction, question, response, feedback and management. Each of the sections are further subdivided where "instruction" has

lecture (LE), chalk-talk (CT), explaining using examples from life (EL), explaining using material (EM), probe (PB), directives (DR) and cues (CU). Each of these gathers information about teacher verbal behaviour related to instruction.

There are four categories under "question" which are high level or thinking questions (HQ), recall questions (RQ), opinion questions (OQ) and redirecting questions (RD). Questions can be coded with the teacher or student. This section gathers data on the frequency and nature of questions and how often teachers redirect questions from one student to another.

The categories under response are response (RE), recite (RC), extended response (EX), don't know (DK), and statement (ST). These are coded with student or group.

The codes under "feedback" are acknowledging positively (AC), wrong (WR), punish (PU), repeat answer (RA), give answer (GA), effectiveness of teaching (EF), silence (SI) and criticism (CR). Out of these, the only code that is used with both the teacher and the students is SI. All others are teacher codes. The categories in this section gathers information about the type of acknowledgement given to the students, the frequency with which teachers repeat or give answers and the effort made to check the effectiveness of teaching.

Discipline (DI), procedure (PR), can't hear (CH) and social (SO) are the categories under "management". The code, "can't hear" is used only when the observer is unable to hear the interaction.

b.iii. Qualifier

Under this, there is just one code, which is emphasis (EM). This is coded with other codes under "what" to indicate the stress or emphasis on these.

b.iv. Coding

Whenever an interaction occurs, first the initiator followed by the individual to whom it is directed is coded followed by what, that is the type of interaction. For instance, if the teacher asks a recall question to the class, it will be coded TG Rq.

Suppose the class calls out the answer then, the code is GT Re.

At times, the same event may continue for a while but at other times, the events may keep changing.

When the same event continues, it is coded every five seconds but whenever there is a change in event, it is coded. The example is the teacher asking a high level question to a student where the student gives a partial answer which is followed by a probe from the teacher and the answer from the student. The codes follow:

TS Hq
ST Re
TS Pb
ST Re

On the other hand, if the same event like teacher lecture continues, then every five seconds, the code will be repeated as TG Le.

This implies that this instrument uses a mixture of time and event coding.

Whenever there is an emphasis on any statement, it is double coded with em. Example is the teacher saying "John, I do not want you to make noise. Is that clear?" This will be coded as TS Di em

b.v. Validity and Reliability of the observation instrument

Over the years, the instrument has been used in various researches by the author and had been modified, to suit the needs of large classrooms in developing countries.

On various occasions, whenever modifications were introduced, inter-observer reliability was computed using Pearson r, which ranged between 0.72 to 0.85, which is of acceptable level.

**c. Achievement test in mathematics**

Each grade in each of the schools had short tests of 20 items each, five of which were used in measuring the ability of the students to apply the concepts learned in new situations while the other fifteen were the usual recall type items. These tests were prepared along the lines of the school tests except the five items that had different structure and due to time factor, were not trial tested. All the same, the items were validated, using the opinions of experienced primary school teachers.

**d. Self and peer evaluation questionnaire for teachers**

This instrument was used to find out from the teachers the role of students in the lessons observed, the opportunity provided to the students for active involvement in the lesson, strengths and weaknesses of the lesson and the areas that need to be improved. This was used during the time the lessons were viewed.

iv. The training procedure

Although training was planned for all the teachers, as mentioned earlier on, it only took place in School 3. The plan was to give the teachers the opportunity to view their lessons and in the evaluation form, identify the areas of strengths and weakness. This was to be followed by selection of areas that are common across teachers, prepare lessons where these would be stressed and give demonstration lessons followed by questions and critique of the lesson. Training was to be followed by video taping of lessons, viewing and evaluation. On four different occasions, due to a number of trivial reasons, the school kept postponing the training, which made it impossible to complete the study as planned. Instead of post training video taping and viewing, teachers were asked to try out the approaches introduced during training, in their respective classes and report back at each of the training sessions.

v. Analysis Procedure

Observation data is analysed using average percentage frequencies for each of the categories for each of the 27 teachers.

Due to space limit, only qualitative description of performance on the items that tested application of concepts as well as the feedback by the teachers about the training procedure is included in this paper.

**Results and discussion**

The results will be discussed under the following headings: (a) Classroom interactions (b) Qualitative description of students responses to items on thinking (c) Teacher self-evaluation (d) Feedback from the teachers about the training.

**a. Classroom Interactions**

i. Who to whom interactions

Table 1 gives the summary of observation of "who to whom" section for all the lessons averaged for each of the 27 teachers.

Average percentage of interactions between the teacher and the whole class (TG) ranges between 20 and 88 with a mean of 52 and a median of 46. It is believed that in any conversation, by seizing the initiative to speak, a person may be attempting to dominate the other by placing them in a position to respond (Robertson, 1989). This appears to be

Table 1 Summary of "who to whom" interactions

| | | Sch2 | | | | | | | | | | | | sch1 | | | | | | sch3 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | category | 4A | 4B | 4C | 4D | 5A | 5B | 5C | 5D | 6A | 6B | 6C | 6D | 4A | 4B | 4C | 4D | 5A | 5B | 5C | 4A | 4B | 5A | 5B | 6A | 6B | 7 | 8 |
| 1 | TG | 67 | 63 | 43 | 63 | 50 | 59 | 20 | 61 | 45 | 38 | 42 | 44 | 41 | 28 | 53 | 51 | 34 | 46 | 31 | 77 | 41 | 84 | 88 | 22 | 76 | 83 | 41 |
| 2 | TS | 6 | 4 | 14 | 5 | 34 | 8 | 28 | 9 | 9 | 14 | 5 | 3 | 17 | 22 | 7 | 9 | 10 | 6 | 11 | 0 | 46 | 0 | 0 | 69 | 8 | 6 | 55 |
| 3 | GT | 19 | 23 | 34 | 21 | 15 | 24 | 51 | 28 | 42 | 46 | 48 | 49 | 31 | 44 | 16 | 27 | 46 | 43 | 55 | 15 | 8 | 15 | 11 | 3 | 2 | 6 | 3 |
| 4 | ST | 8 | 10 | 8 | 11 | 1 | 9 | 1 | 3 | 3 | 2 | 4 | 4 | 11 | 6 | 24 | 12 | 10 | 5 | 4 | 8 | 5 | 1 | 1 | 6 | 15 | 5 | 0 |

true in the classes observed where the students assume the subordinate role and never initiated any interaction.

In order to show the general trend of teacher to whole class interactions of the sample teachers, the data is sorted into a frequency table which follows:

Table 2 Frequency distribution of teacher to whole class (TG) interactions

| Percentage | Frequency |
|---|---|
| 0- 20 | 1 |
| 21-30 | 2 |
| 31-40 | 3 |
| 41-50 | 9 |
| 51-60 | 3 |
| 61-70 | 4 |
| 71-80 | 2 |
| 81 & above | 3 |
| Total | 27 |
| | |

Only 3(11%) out of 27 teachers have teacher to whole class interactions below 30% while 12 (44%) have 50% or above. The distribution of teacher to whole class interactions form a negatively skewed curve which implies that majority of the teachers spend 50% or more of class time addressing the whole class while in mathematics classes, especially at the primary school level, one expects more of teacher to individual interaction.

On the other hand, teacher to individual student interactions range from 0 to 69 %where only 3(11%) teachers have 45% or above interactions in this category, which is just the reverse of that observed under teacher to group interactions.

Frequency distribution of teacher to student (TS) interactions is given in table 3. Due to the small percentages under this category, the class interval used is 5.

In this case, the curve is positively skewed with 20(74%) teachers with 0 to 14% of interactions falling under teacher to student interactions, which indicates that in these mathematics classes, individual attention and feedback was rare.

As teacher to class interactions is high, obviously, the proportion of call out responses to the teacher (GT) is also high. Individual student to teacher (ST) interactions are very low and ranges between 0.3 to 23.5% where actually only one teacher had 23.5% of interactions falling in this category.

Table 3 Frequency distribution of teacher to student (TS) interactions

| Percentage | Frequency |
|---|---|
| 0-4 | 5 |
| 5-9 | 11 |
| 10-14 | 4 |
| 15-19 | 1 |
| 20-24 | 1 |
| 25-29 | 1 |
| 30-44 | 1 |
| 45-49 | 1 |
| 50-59 | 1 |
| 60-69 | 1 |
| Total | 27 |

ii. Interactions under the section "What"

In this section, there are 28 categories under five major headings. In any class, there are teacher behaviours that encourage as well as discourage student active participation in the lesson. Based on previous research results (Amidon & Flanders, 1963; Flanders, 1970) and personal experience as a teacher, some of the categories are merged to form the democratic and autocratic behaviours of the teacher. For instance lecture, chalk- talk and directives are teacher behaviours that dominate the lesson thereby making the students listen and obey orders from the teacher. On the other hand explaining the content by relating to examples from life, explaining with materials, probe and cues get the students to take active part in the lesson thereby making a more relaxed classroom atmosphere.

Table 4 gives the average percentage of various categories merged as explained above.

Note: Meanings of merged categories

1. lcd-lecture, chalk-talk, directives
2. elempbcu-explaining by relating to life, explaining with materials, probe, cues
3. hqoq-high level / thinking questions, opinion questions
4. rqrd-recall / memory questions, redirecting questions
5. rerc-respond predictabily, recite/read from book or pre-prepared material
6. exst- extended response which means going beyond the answer, statements that are voluntary
7. acef- acknowledging positively, checking effectiveness of teaching
8. pgrc- punishment, giving answers to questions by self, repeating student answers, criticising
9. dp- disciplining, procedure
10. chso- can't hear(when the interaction is not audible to the observer), social interactions
11. sidk- silence while on seat work / while teacher is waiting for an answer and don't know when the student says so

Among these eleven merged categories 1,4,8 and 9 are teacher behaviours that restrict student active participation in the lesson while 2,3, 7 and 10 are those that give more

Table 4 Summary of data on the section "What"

| | | Sch2 | | | | | | | | | | | | Sch1 | | | | | | Sch3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4A | 4B | 4C | 4D | 5A | 5B | 5C | 5D | 6A | 6B | 6C | 6D | 4A | 4B | 4C | 4D | 5A | 5B | 5C | 4A | 4B | 5A | 5B | 6A | 6B | 7 | 8 | |
| 1 | lcd | 33 | 26 | 12 | 37 | 9 | 14 | 7 | 23 | 21 | 19 | 8 | 20 | 20 | 13 | 13 | 17 | 16 | 13 | 15 | 37 | 35 | 76 | 69 | 0 | 51 | 33 | 38 | |
| 2 | El Em pbcu | 2 | 2 | 2 | 3 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 7 | 4 | 5 | 3 | 2 | 3 | 5 | 8 | 2 | 2 | 0 | 5 | 5 | 1 | 1 | |
| 3 | hqoq | 3 | 3 | 3 | 4 | 1 | 0 | 3 | 2 | 3 | 2 | 2 | 4 | 2 | 1 | 4 | 3 | 1 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 3 | 0 | |
| 4 | rqrd | 17 | 15 | 10 | 19 | 3 | 12 | 21 | 23 | 13 | 13 | 12 | 12 | 15 | 16 | 8 | 23 | 13 | 8 | 6 | 18 | 7 | 13 | 11 | 9 | 14 | 8 | 2 | |
| 5 | rerc | 25 | 30 | 47 | 28 | 18 | 32 | 40 | 36 | 44 | 45 | 58 | 57 | 41 | 52 | 38 | 38 | 54 | 48 | 43 | 22 | 12 | 8 | 9 | 10 | 16 | 10 | 2 | |
| 6 | exst | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7 | acef | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | |
| 8 | pgrc | 3 | 0 | 3 | 1 | 2 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | |
| 9 | dp | 16 | 2 | 9 | 3 | 3 | 3 | 1 | 2 | 6 | 5 | 1 | 1 | 2 | 2 | 24 | 11 | 7 | 23 | 9 | 12 | 0 | 0 | 4 | 4 | 6 | 3 | 2 | |
| 10 | chso | 0 | 0 | 1 | 0 | 0 | 11 | 25 | 8 | 4 | 13 | 2 | 0 | 5 | 0 | 0 | 0 | 1 | 2 | 12 | 0 | 43 | 0 | 4 | 69 | 4 | 0 | 0 | |
| 11 | sidk | 0 | 22 | 12 | 3 | 63 | 23 | 1 | 1 | 6 | 3 | 15 | 3 | 5 | 12 | 7 | 3 | 3 | 2 | 5 | 3 | 2 | 1 | 0 | 2 | 2 | 42 | 55 | |

freedom for student active involvement in the learning process.

Student behaviours in 5 go along more with teacher behaviours in 1,4,8 and 9 while teacher behaviours in 2,3,7 and 10 will lead to more of 6.

In table 4, lcd interactions ranges from 0 to 76% where only one teacher has no interactions under this category. The percentage for rqrd ranges between 2 and 23 with a mean of 13.

The student category rerc has percentages ranges from 2 to 58 with a mean of 32.

The categories 2 and 3 have very low percentage s, which range between 0 to 8 and 0 to 4 respectively.

The other categories that have slightly higher mean percentages are silence with 11 and can't hear and social combined with 7.5.

From the results, it could be concluded that more often, the teachers in the sample used whole class instruction, that was dominated by lecture, chalk- talk, directive and recall questions. The students did respond to teachers' recall questions or obeyed teachers' orders but never was there any voluntary contribution.

b. Student response to selected application items

Due to space limitation, qualitative description of student response to just three items, one each for grades 4 to 6, which are common across schools is given here.

i. Example from Grade 4

Mary went to the market with K20.00. After shopping she had K1.08 change. How much did she spend?

Over 90% of the students added up the two amounts. Some might conclude that it is due to the inability to comprehend. As this was envisaged, tests were administered with the help of tertiary students who translated the problems to local languages. Students are taught addition and subtraction but these were not linked to every day problems. The other fact is that whenever a problem of this nature was given, the teacher wrote

K20.00
-K1.08

And then asked, " What is to be done" followed by the chorus answer "subtract".

Often, the students are not given the chance to think, which is a serious problem to be solved.

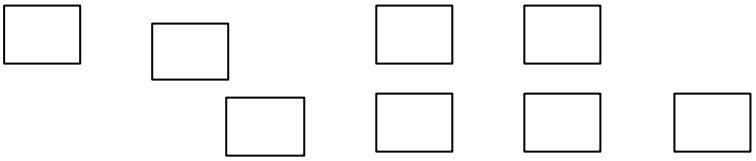
ii. Example from Grade5

Here are four equal squares of side 1unit. Find the side of the biggest square that can be formed by using all these squares.

This is something they have not been exposed to and no one attempted the question.

iii. Example from Grade 6

Here are eight equal squares of side one unit. Find the area of the rectangle that can be formed by using all the squares.



Although the students are used to calculating areas of squares or rectangles, the question asked is new to them, which made them not attempt it. At the same time they all got the answer to the question that asked to find the area of a rectangle of side 4cm $\times$ 2cm.

When questions were direct, most students responded somewhat well but the same concepts that tested originality were poorly responded. Ability to think and apply the concepts learned in novel situation was not done in the class, which is also seen among tertiary level students.

Teacher to whole class interactions and recall questions dominated the lessons, which do not challenge the student ability to think and do not provide the opportunity for personal contributions. This approach, according to the tertiary level students, dominates all levels of teaching hence their inability to adjust to exploratory or investigative teaching approaches.

c. Teacher self evaluation

This was done only in school 3 where the lessons were video taped. As they were viewing the lessons, teachers completed the evaluation form in terms of nature of the lesson, student role, merits and defects of the lesson and the particular aspects that they would like to improve upon. It was shocking that most of the teachers in School 3 felt that their teaching was excellent and most considered student response to teacher's questions as active participation in the lesson. Once a person assumes that s/he is good in teaching, it is actually very difficult to improve, which is already happening in this case. There was a small group that indicated about the need to improve on skills like questioning technique, ways to get active participation by the students and the approach to make the lesson interesting.

d. Post training feed back

After the training, teachers identified the areas where they felt that they had improved and these are questioning techniques, the ability to involve the students in the lesson through questions and use of explorative approach rather than the lecture one. Some of them mentioned that they were happy about the change in student involvement in the lesson which according to them was an incentive to work harder to make the lessons more student centered. This last remark was seen in

a number of reports, which also was an incentive to the author. Out of the eight teachers, three in particular gave very positive views about the opportunity provided to view the lessons and the training with the request that the training and evaluation should be completed at another time, which was really encouraging.

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