

THE CULTURE OF TEACHING AND LEARNING IN SUCCESSFUL SIXTH FORM PHYSICS CLASSROOM

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Abstract *Artikel ini cuba memberi penjelasan tentang kejayaan SMJK Berjaya dalam mata pelajaran Fizik Tingkatan Enam. Kajian ini meneliti pengalaman pengajaran dan pembelajaran guru dan pelajar daripada dua pekspektif. Ia juga membuat eksplorasi tentang ekspektasi pelajar dalam pembelajaran fizik dan peranan guru dalam pengajaran. Dengan menggunakan keadah etnografi, satu jadual telah dibina untuk memerhati aktiviti yang sedang berlaku di dalam bilik darjah. Dapatan kajian menunjukkan paten pengajaran yang dipenuhi dengan aktiviti 'kapur dan cakap' yang disulami dengan 'hentian' tetapi disusuli oleh tugas yang berorientasi kandungan pelajaran, akhirnya memberi faedah kepada pelajar. Budaya kesungguhan dan usaha, bertanggungjawab dan berdikari adalah nilai-nilai yang ketara di kalangan guru dan pelajar yang disanjung oleh pentadbir sekolah. Secara keseluruhan, pelajar dan guru mempunyai sikap positif terhadap hasil akademik mereka. Ini merupakan petanda kepercayaan tentang kemampuan mereka sendiri. Dapatan kajian juga menunjukkan budaya pengajaran dan pembelajaran di SMJK Berjaya memainkan peranan penting dalam membantu kejayaan akademik pelajar dalam peperiksaan STPM.*

INTRODUCTION

In the last four years, SMJK BERJAYA have been producing excellent results in the STPM examinations. The school's, passing percentage in physics was much higher compared to the national level (at 77%), achieving (100%) in three consecutive years. In 1999, the State Education Department requested the school to give accounts on the schools consistent excellent performances. In brief, the teachers and administrators gave the following reasons for its academic successes:

- Having academically diligent and responsible students' with potentials from two other feeder schools.
- Even with strong academic competition among themselves, students still discuss, help each other and share knowledge.
- For students from low-income families, they work very hard to gain entrance to public local universities.
- Having experienced and dedicated teachers, who taught Sixth Form with ten to fifteen years experience. About (20 –25 %) of these teachers are/have been examiners in public examinations (SPM or STPM).

Lessons in the Lower Six starts immediately after students report for school with a prepared timetable prior to admission. In cases of teacher shortage, lessons were conducted in a lecture style in the lecture hall with no classes left without a teacher.

The school provides students enough facilities, like laboratory equipment and reference books. The school library opens daily until 10:30 in the evening (including weekends and holidays) manned by the Sixth form librarians. Were the reasons given by the school explains the academic success sufficiently? The authors believed that the total culture of teaching and learning has brought this exceptional achievement, the study looked into this phenomenon.

LITERATURE REVIEW

In the past academic achievement had been considered from the cognitive perspectives and the social economic status of a child's family. Previous studies on the school's influence in the academic achievements were mainly focused on school facilities, teachers and administrators opinion. What actually happens in school and inside the classrooms daily in many ways are neglected. There are studies, which fail to describe the actual processes of teaching and learning (Mehan, 1979; Rowan et. al., 1983). Many recent studies have also indicated that the cultural backgrounds of the students should be considered in the teaching-learning processes (Rowan, 1983; Stevenson & Stigler, 1992; Watkins & Biggs 1996). SMJK BERJAYA is a "Chinese" school, where majority of the students are Chinese. Could the influence of the Confucian culture that emphasizes diligence and effort (Stevenson & Stigler, 1992; Watkins & Biggs, 1996) played a role in the school's academic achievements?

It is probable that the events taking place in the classrooms and the teachers' and students' perceptions of these events vary and reflect the values of the bigger culture (Olson, 1988; Hamilton, 1993 ; Planel, 1997). For example, French are generally more willing to accept teacher's authority, emphasizing the values of hard work and prefers structured lessons in class. On the other hand, the English relate success to individual abilities and prefers more loosely structured lessons that encourage explorations. Hence, it would be appropriate to state that the bigger culture (of the various societies) does have influence on the culture of the classrooms, both, for the teachers and the students (Fraser & Fisher, 1983; Hatano & Miyake, 1991; Guild, 1994; Leung, 1995).

Previous studies on teaching and learning provided the what and how on the activities and events that transpired in the classrooms (Tobin & Gallagher, 1987; Mu, 1994; Su et. al., 1994; Salili, 1996; Gao, 1998). There were also many suggestions as to what constitutes good and effective teaching and learning (Yates, 1990; Arends, 1994; Cooper & McIntyre, 1994; Huffman, 1997; Engelman, 1999), including the appropriateness or preferences of the methods of teaching and learning for certain subjects (Stevenson & Stigler, 1992; Su et. al., 1994). It is also important to consider the contexts in which the what's, how's and why's were explained. For example, rote-learning is generally considered an ineffective method of learning, but has a different meaning among the Confucious-Heritage-Culture students in as much that they have found it a useful method to obtain good academic outcomes (Stevenson & Stigler, 1992; Leung, 1995; Marton et. al., 1996; Watkins & Biggs, 1996). The teachers' also influence students' perceptions on their roles and duties, the way they taught and the way students learn (Bamdt, 1987; Tobin & Gallagher, 1987; Hess & Azuma, 1991 ; Stevenson & Stigler, 1992 ; Salili, 1996 ; Tang, 1996 ; Gao, 1998 ; Gardner, 1999). The bigger culture had also been shown to influence the outcomes of science teaching and learning (Ciparick, 1995).

Believing that the bigger culture is the classroom, and the contexts of teaching and learning taking place are interdependent and related, and to understand what makes SMJK Berjaya so academically successful warrants the need to look into what actually takes place in its classrooms. It is very important to take into consideration the climate and contexts in which the events happened with the need to know on the teachers' pedagogical approach as well as the students' responses. All these practices will contribute to understand better how teaching and learning takes place within its contexts (Novak & Govin, 1984; Touhy, 1999).

What influences the effectiveness of teaching and learning of physics? Teachers' epistemological beliefs, in contextual and cultural (classrooms), were offered as platforms of explanations. However, whatever happens in the classrooms cannot be explained through mere observations only. The framework to interpret the events that occurred should also be considered such as the social culture, the beliefs and expectations of the teachers and students. Hofstede (1997) suggests that to identify the teaching and learning cultures is to identify the symbols, heroes and rituals of the teachers and students. This leads to the clear understanding of thinking patterns, feelings and potential actions that supports their culture.

This study looked into the cultural aspects of the teaching-learning process. The culture includes the patterns of thinking, feelings and potential acting (Hofstede, 1997), which is also related to the classroom practice. In the classrooms, three aspects were considered: (1) the process and structure of learning; (2) the relationship and forms of communication between students to students, students to the teacher; and (3) the forms of evaluation and feedback given. This includes the teacher's and students' perceptions of learning and the subject taught and learned, their beliefs about the nature of science and their understanding of the subject, the context to which a particular topic is learned or taught, the learning culture in and out of the classrooms, the students' attitudes toward school work, learning styles/habits, time allocated for revision and homework, and discussions with friends or teacher. The final aspects looked into their beliefs on the nature of science and about learning, their perceptions, beliefs, understanding and contexts in which teaching/learning activity had taken place are linked and thus, influenced the learning outcomes. All these formed certain culture, as the authors wanted to know what actually happens in the classrooms. A schedule was prepared to observe the sequence of events inside the class.

METHODOLOGY

Using the ethnographic methods, only two teachers and three six form classes were studied over a period of three months. In addition, it also included the learning habits of 18 students in and out of the classrooms. Each class was observed for four weeks and during observations, a schedule (Appendix A) was used to record the sequence of teaching and learning activities. The schedule was prepared based on the usual classroom activities that took place in a typical Malaysian classroom. This was pilot tested for a short period only and was found to be appropriate for the purpose of the study. Field notes were also taken supplemented with an audio recording done during class sessions. The two teachers and six selected students from each class were interviewed using the semi-structured questions (Hogan, 1999).

This paper presents some initial findings supported by the interviews and the classroom observations done. It is hoped that the outcome of the study will help identify and understand what makes teaching and learning truly effective in the Malaysian context. The names of the respondents were changed for this purpose.

FINDINGS

Mr. Ong's Typical Physics Lesson

The day's class normally begins with a quick review of the previous lessons. He starts by writing the sub-topic titles of the past lesson, giving brief explanations on what is written starting with main formulas and definitions. Sometimes, the reviews were in a form of questions or exercises related to the previous activity. The teacher believes that it is helpful for students who could not remember the previous work thus, helping students see the "connections". As Mr Ong explained in one of the interviews:

I like to repeat a lot because after one or two lessons, they may not go home and read, so they probably have forgotten what I have discussed earlier. I like to repeat the whole thing again to let them see the whole sequence.

The physics class of Mr. Ong, proceeds with the introduction of the new topics (sometimes clearly stated by the teacher). The dominant activity in teaching was chalk-talk style but from time to time, the use of other available materials in class like the chalk box, duster were often observed used to illustrate certain point.

The overt teacher-student interactions were minimal, although Mr. Ong tries to tell his jokes in class. If questions were asked, it is directed to the class, however, Mr. Ong do not expect students to answer as he explained:
... because of time constraints, so I really teach as the class starts till it ends. And I seldom ask questions because there is no time.

On the major part of the lesson, the teacher talks or writes on the board and students would either listen or write notes. Most of the time, the focus was on the teacher for the content. Sometimes students discuss among themselves pointing to what was written on the board or on their notes. Their facial expressions often indicate confusion or uncertainty. The interviews revealed students confer notes among their friends on certain points or doubts and hardly ask questions from their teachers.

In between the chalk-talk activity, Mr. Ong have instances of pausing, "teacher silence" as he introduces a new activity. During the problem solving part, even if Mr. Ong would discuss the answers to students', most are observed trying hard to get the solutions/answers. During this time, students work with calculators, others are actively computing from memory while some are seen discussing with their seat mates.

After each lesson, sometimes few students would approach Mr. Ong to ask questions on difficult lessons, seeking clarifications over certain aspects even on previous lessons and occasionally would crowd around him "to get a share of information".

Other observations

For most part of the lessons, Mr. Ong would ask students to answer the questions or exercises related to either past or present lessons. Sometimes, students are asked to do their work at home as most of the questions were discussed in class. Mr. Ong also allowed students to complete their work within the given time, stressing on the importance of regular revisions and hard work. He keeps his patience even when students don't do their work and does not label students calling them "lazy".

INTERVIEWS

Mr. Ong

From the interviews, Mr. Ong sees himself as a good teacher who mastered the subject (Form 4 to Form 6 physics). He goes to class without notes or books but equip only with a syllabus and guide questions for the class discussions with no prepared answers to the sets of questions. He believes in his innate teaching abilities with very positive attitude. He said

I am not boasting about myself. I think I have the talent in teaching in school and in my church. I like to teach, that's why I end up teaching (laughs).

For Mr Ong, a good teacher must have the ability to impart the lesson well in order to make the students interested. Mastery in the content only is not enough. To him

Teachers may have a lot of knowledge but sometimes they cannot express themselves well.

He puts "natural ability" as the first asset for a teacher's success. He commented that at the present Form 6, students are not so hardworking. To him, student's effort is an important determinant to success compared to innate abilities. For this, he said

They, they of course the first one is the usaha belajar, his effort. I have seen a boy who, who is very poor in Form Five but study very hard still manage to get quite good results. He came and asked me a lot of questions. Sometimes the questions are too simple, is quite low standard I should say, but he managed to get quite good results. So it's efforts. Effort you rank number one for me...

He finds the most important aspect of teaching is to make physics

Interesting for students. As he continually explained:

If you can arouse their interest so whether you can explain it well or not, they will try to find ways to understand.

Interviews with the students

Although physics may not be the favorite subject of most students interviewed they still prefer physics as their option in Form 6. For the students the ability to do well in physics is not dependent on memory like biology, which is their other option. To them physics, requires understanding and application of the concepts, laws and formulas,

... physics is easier than Bio, easier to score than Bio. Bio needs lots of memory..

(CSY : L6F3)

It was also the same reason given by some students finding physics difficult. As one student said:

... physics, one formula, example, $F=ma$, may have other formulas related to it. Therefore you must relate them but sometimes you forget.

(KMK : L6F3)

Almost all of the students interviewed mentioned that physics is interesting because they can relate it to what they have observed in their daily lives. One of the most common qualities of a good physics student, according to those interviewed, is diligence. All the students mentioned this trait repeatedly in all the interviews. Although some mentioned intelligence and self-abilities, they perceived it to "make life easier". To most students diligence is a trait expected by their teachers, as what the other students (and even teachers) believed is important

I feel that even if you have natural ability, if you don't work on it, if you don't pay attention, maybe you just (pause) physics, maybe you can get some marks on your natural ability (pause) but you can't do very well..

(LST : L6F1)

Most of the students rated themselves on the average, or slightly above or below average in physics. Only one mentioned specifically that he was slow (LST : L6F1), consistent with his SPM and Final Year exam results. The students' perceptions were somewhat different when asked to compare themselves with their other friends. As gleaned from the interviews, their self-evaluations were based from their examination performance on their abilities to solve problems, and during their reviews or when asked by friends.

The 50% of the students disliked physics and liked subjects, which are easy to get high marks. Only eight chose physics because of interest. Only one (CEY : L6F1) liked physics because it challenges him after scoring A1 in SPM, and obtaining the highest marks for physics in a short test given and in the Final Year examination. About eight students said their purpose for studying is to get good results, while the other ten opted for knowledge. It was also evident that students who study for examinations hoped to get some knowledge about physics, and those who study for knowledge were those who got high in the STPM results. However, only three of the eight students who study to get good results perceived their teacher stressed on examination results. Twelve students said their teachers give more importance to knowledge gained.

About their teachers

The students had very positive opinions about their teachers. Their most common reasons given whether asked or not were:

the teacher we are having now is very good, I can say that. ... When he finished a topic, he gave us a lot of exercises..

(LYP : L6F1)

...he very bertanggungjawab punya cikgu (responsible teacher) Dia benar-benar nak ajar punya (he really wants to teach)

(NHV : L6F3)

Although the students finds Mr Ong to be a good teacher, the slow learners finds his lessons boring.

Sometimes very boring ...

(WMY : L6F3)

but Mr. Ong's teaching is very boring .. he only mention, not put some interesting things in it and explain.

(KMK : L6F3)

Ways of Learning

All the students (except NHV L6F3) believed that physics cannot be learned through memorization although some of them answered that they have to memorize laws definitions and formulas, they acknowledged the need to understand what was memorized. \

Memorize mostly specific words of a law... . Others, I try to understand and do and do not memorize because I find that memorising is not effective as you'll forget

(CEY : L6F1)

When students met problems, only one preferred to discuss it with their friends. During the three months observation period not one of the students raised questions during the class although students considered their teachers helpful and approachable. A few reasons were given by students prefer to think about it first, finding for the solutions themselves before asking their teacher and their usual response were:

... questions should be carefully thought out before they can be asked. If you simply ask questions, then it's useless.

(CEY : L6F1)

Because I want to think first. Maybe I might be misunderstood

(MWY : L6F3)

Kita tak tahu adalah sama ada kami faham atau tidak . You mesti balik buat kerja You mesti cuba dahulu.

[We do not know whether we understand or not ... You must go back do work .. You must try first.. J

(YYT : L6F3)

They (all but one) prefer to discuss with their friends.

But actually we do discussion a lot because we like to come back to school maybe at night, maybe weekends

(LYP : L6F1)

First tanya kawan, lepas itu tanya cikgu.

[First ask friend, then ask teacher. ...]

(PTK : L6F3)

Many of the students consult their friends when they have problems since they don't study in-group, however, work individually and make themselves available for help. They see that they are responsible for their own learning.

Teacher can only teach us until certain level. If want to know further, depends on ourselves.
(TKY : L6F1)

... guru tak boleh mengajar semua bagi you... try to get the answer yourself. [... teacher cannot teach you everything. .. try to get the answer yourself.]
(NHY : L6F3)

The students know their physics teachers are willing to help however feels, they learn better if they do it for themselves. As one student explained :

After all, if you ask teacher, teacher explains already, it's quite (pause) it's not the result of your thinking or discussion (pause) more or less the effect is not there.
(CEY : L6F1)

It's unfair to "disturb the class/lesson with their questions.

I can't just stop the lecture to just to get the understanding for myself. It's very unfair to others
(LYP : L6F1)

Most of them understand, so if you ask, it's like wasting time.
(KMK : L6F3)

SUMMARY

Although the teacher-student interaction seemed minimal in class, the students actively seek to understand the lessons in their own ways. From the class observations and interviews, it can be concluded that a lot of self-teaching or *autodidacticism* took place in and after normal school hours. Generally students finds discussing with friends beneficial, knowing very well their teachers are willing to help them when and if necessary. In the classroom students defer their questions and prefer to find solve it themselves through reading or consulting friends. The teachers served as guides, what should be learned. Ultimately, to most students, the responsibility of learning is placed on themselves to them, learning starts and end with the teacher.

The students also realized that to do well in physics, they must understand the whole concepts well. They reject rote learning although some laws, definitions and formulas in physics have to be memorized or memorize it with understanding. Generally, the students and teachers share the same opinion that success in examinations can only be achieved through diligence, and innate abilities may be useful but not an important factor. Many of the students interviewed felt they have exerted enough effort in their studies. Most of their time was spent doing homework with one to three hours devoted for reviews daily.

The teacher interviewed showed positive attitude and confidence on his mastery in content and in his ability to teach physics. His perceptions on the role of a teacher was consistent with that of his students about learning — to gain understanding and knowledge and mastery of the subject which is manifested through the students achievements in examinations. The teacher also believes that stimulating the interest of students can motivate them to learn and find more.

Overall, teaching need not be fun or interesting to be considered effective. The traditional chalk-talk method will still work. However, combine with anecdote or humour to "lighten" the lessons. The most significant from Mr. Ong's lessons were the pause or "teacher silences" observed in many occasions throughout the teaching period. Without any formal cues, the students were seen working and discussing among themselves during these pauses. Mr Ong "silences" from the interviews gleaned provided silences for the students to allow them to assimilate and catch up with the lessons.

The school administrators showed trust and confidence in their teachers by conforming to the teachers practice and support their students by providing access to the school facilities. The students, teachers and administrators of SMJK Berjaya have a common distinct goal, that is, achieving academic excellence. Even the Parent Teacher Association and the school's Board of Governors extend financial aids as a gesture of support. Everyone worked together to make academic success a reality. One pertinent question that ought to be considered after this study will be, "How did this culture of excellence in SMJK Berjaya come about ? Other questions that need to be answered are:

1. Does doing well in physics in public examinations indicates that students have
 - a. critical and creative minds as should scientifically literate individuals ideally possess ?
 - b. proper understanding about the nature and processes of scientific endeavours, particularly in physics ?
2. Will students be able to make scientifically sound judgments and decisions on issues that affect them personally or professionally?

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