

ANALYSIS OF TEACHERS' EMOTIONS TOWARD THEIR APPROACHES TO
TEACHING IN SECONDARY EDUCATION BY USING
PRINCIPAL COMPONENT ANALYSIS AND CLUSTER ANALYSIS

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Specially dedicated to my beloved father and mother

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ABSTRACT

The purpose of this study is to investigate the relationship between teachers' emotions in teaching and their approaches to teaching in secondary education. The study was conducted among 112 teachers in secondary school by using two different questionnaires which are the Approach to Teaching Inventory and the Emotions in Teaching Inventory. The results suggest that there are significant relationship between teachers' emotions in teaching and the approaches that they used in teaching and learning process either student-focused approaches or teacher-focused approaches. The data was analyse using Principal Component Analysis and cluster analysis. As a result, we identified that teachers experienced more positive emotions when they used student-focused teaching approaches and more negative emotions when they used teacher-focused teaching approaches.

ABSTRAK

Tujuan kajian ini dijalankan adalah untuk mengkaji hubungkait antara emosi guru-guru dalam pengajaran dan pendekatan yang mereka gunakan untuk menyampaikan pengajaran. Kajian ini telah dijalankan di antara 112 orang guru sekolah menengah dengan menggunakan dua set soal selidik iaitu *Approach to Teaching Inventory* dan *Emotions in Teaching Inventory*. Keputusan yang didapati menunjukkan bahawa terdapat hubungan yang ketara antara emosi guru-guru dengan cara mereka mengajar semasa dalam proses pengajaran dan pembelajaran sama ada cara pendekatan itu fokus kepada pelajar atau fokus kepada guru. Data yang dikumpul dianalisa dengan menggunakan *Principal Component Analysis* dan *cluster analysis*. Keputusannya, kami mendapati bahawa guru-guru mengalami emosi yang positif semasa mereka menggunakan cara pendekatan berfokuskan kepada pelajar dan guru-guru mengalami emosi yang negatif semasa mereka menggunakan cara pendekatan berfokuskan kepada guru.

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LIST OF ABBREVIATIONS

ANOVA	-	analysis of variance
ATI-R	-	Approaches to Teaching Inventory
CCSF	-	conceptual change/student-focused
CFA	-	Confirmatory Factor Analysis
CLT	-	cognitive load theory
ETI	-	Emotions in Teaching Inventory
ITTF	-	information transfer/teacher-focused
PCA	-	Principal Component Analysis
PEATID III	-	Physical Educators' Attitude Toward Teaching Individuals With Disabilities III
TELS	-	Teacher Emotional Labor Scale

LIST OF SYMBOLS

e	-	normalized eigenvector matrix
<i>M</i>	-	mean
R	-	sample correlation matrix
S	-	sample covariance matrix
SD	-	standard deviation
x	-	eigenvector matrix
X_i	-	variables in principal components
Y_i	-	principal components
λ	-	eigenvalue

CHAPTER 1

INTRODUCTION

1.1 Introduction

In teaching, there are many mental operations that may influence how teachers teach at any level. According to Mayer, *et al.* (2000), psychologists now recognize that emotion should be included in the three fundamental classes of mental operations along with motivation and cognition. But, the research on teachers' emotion is not widely done compared to motivation and cognition. Most of the researchers focus on beliefs, thinking and knowledge (Borko and Putnam, 1996; Calderhead, 1996) and some on beliefs and attitude (Richardson, 1996). Since early 1970s, research on teachers' cognition has been developed and expanded by the rapid growth of research in the cognitive psychology (Calderhead, 1996). In contrast, research on emotions was conducted in the early 1980s (Lewis and Haviland, 1993).

Eventhough many researchers did not realise the importance of emotions in teaching development earlier, it has been proven nowadays that emotions have interrelation in teaching. In Hargreaves (2005), teachers' emotional commitments and connections to students related to anything that those teachers did, including how they thought, how they planned and the structures in which they preferred to teach.

Teachers can use variety of approaches in teaching to make it more interesting and to attract students to learn. How teachers develop the teaching approaches is based on teachers' creativity itself.

In terms of the approaches that have been used, there are two categories which are teacher-focused and student-focused approaches. Basically, teacher-focused approaches is being used by those teachers who see teaching mainly as the intention to transfer and share knowledge with their students. Meanwhile, for those teachers that use student-focused approaches to teaching are more likely to teach the students who self-report adopting more meaningful or deeper approaches to learning (Ho *et al.*, 2001; Trigwell *et al.*, 1999). In this study, we will reduce the teachers' emotions in teaching and identify the relationship between teachers' emotions toward their approaches to teaching in secondary education.

1.2 Research Background

Researches done on the emotional aspect in teaching started since 1980s. However, there are no reported studies about teachers' emotions during teaching may be related qualitatively with different approaches they use to teach in a course. In a case study of Trigwell (2011), this research has been done among the university lecturers.

In Trigwell, Prosser and Taylor (1994) study, they identified five qualitatively different approaches to teaching as follows:

- i) Approach A: A teacher-focused strategy with the intention of transmitting information to students;

- ii) Approach B: A teacher-focused strategy with the intention that students acquire the concept of discipline;
- iii) Approach C: A teacher/student interaction strategy with the intention that students acquire the concept of the discipline;
- iv) Approach D: A student-focused strategy aimed at students developing their conceptions;
- v) Approach E: A student-focused strategy aimed at students changing their conceptions.

Based on the approaches given, we will use two approaches in this study which are conceptual change/student-focused (CCSF) and information transfer/teacher-focused (ITTF) that concluded all the approaches. According to Trigwell and Posser (1998), these two approaches will become a scale in Approaches to Teaching Inventory (ATI-R). For these approaches to be done, there are many factors that have been found to be related in approaches to teaching. According to Trigwell (2011), in a series of studies Prosser and Trigwell found that these following factors will influence teachers to use CCSF approaches:

- i) the characteristics of the students were more uniform (similar prior academic ability, similar levels of language use);
- ii) the class size were smaller;
- iii) teachers felt that they had some control over what was taught.

In contrast with ITTF approaches, it more likely being done when teachers saw teaching are not a valuable thing to do and they felt that they did not have control over what was taught (Prosser and Trigwell, 1999). In this study, it can be seen which teachers' emotions are more likely related to these two approaches.

In general, emotions can be categorised as positive emotions and negative emotions (Sutton and Wheatley, 2005). If the emotions involved pleasure or occurred when one is making progress towards a goal, psychologists classify it as positive

emotions. Meanwhile, the common negative emotions that teachers faced in teaching are anger and frustration (Jackson, 1998; Sutton, 2000). For the fresh-graduate teachers, they are more likely to experience anxiety (Bullough *et al.*, 1991; Erb, 2002; Lortie, 1975; Tickle, 1991). In this case study, we measured ten emotions that will or will not influence the teachers' teaching. Among these ten emotions, there are five positive emotions which are motivation, pride, confidence, satisfaction and happiness while the other five emotions are negative emotions which are anxiety, frustration, annoyance, boredom and embarrassment.

In this research, we will reduce the teachers' emotions in teaching toward their approaches to teaching in secondary education by using Principal Component Analysis (PCA) and cluster analysis. PCA method will reduce the dimensionality of emotions while cluster analysis will identify the effect of the scores in CCSF and ITTF approaches to the emotions stated and vice versa. These results may help teachers or academic developers to understand how to develop new teaching strategies when they face different respondents or students. Sometimes, these results will also help them to find the reason why some new strategies are often not adopted or even attempted (Trigwell, 2011).

1.3 Problem Statement

As mentioned before, there are only a few of research done on teachers' emotions. Sometimes, certain emotions will give a good impact towards teaching and sometimes not. Teachers must have to be very careful to make sure that negative emotions will not influence them in their teaching in any way and they have to control it when it possess themselves.

In this study, we already identified two approaches which are CCSF and ITTF. The purpose of this study is to reduce the teachers' emotions in teaching toward their approaches to teaching in secondary education by using PCA method. To enable this goal is achieved, we need to reduce the variables used by using PCA method at first. The variables in this study are emotions which are motivation, pride, confidence, satisfaction, happiness, anxiety, frustration, annoyance, boredom and embarrassment. After that, cluster analysis are used to investigate which emotions will give impact to which approaches.

1.4 Research Objectives

The objectives of this research are as follows:

- i) To apply PCA to reduce the dimensionality of the variables.
- ii) To identify the variables that contribute more in teachers' emotions.
- iii) To investigate the relationship between teachers' emotions and approaches to teaching in secondary education by using cluster analysis.

1.5 Research Questions

The research questions are as follows:

- i) How can we apply PCA to reduce the dimensionality of the variables?
- ii) What are the variables that contribute more in teachers' emotions?
- iii) What are the relationship between teachers' emotions and approaches to teaching in secondary education by using cluster analysis?

1.6 Scope of Research

A questionnaire used in this study consists of two parts which are Emotions in Teaching Inventory (ETI) and the Approaches to Teaching Inventory (ATI-R). ETI and ATI-R has been used in previous researches as instruments such as in Trigwell (2011), Prosser and Trigwell (2006) and Stes, Gijbels and Petegem (2008). The ATI-R (see Appendix A) has been developed from the identification of qualitatively different approaches to teaching. It is composed of 22 items, with 11 items in the CCSF approach scale (Items 1, 2, 4, 6, 9, 10, 11, 12, 16, 19 and 22) and 11 items in the ITTF approach scale (Items 3, 5, 7, 8, 13, 14, 15, 17, 18, 20 and 21).

The ETI (see Appendix B) contains 20 items with 10 items measuring positive emotions (Items 1, 4, 6, 8, 11, 12, 13, 14, 17 and 19) and 10 items measuring negative emotions (Items 2, 3, 5, 7, 9, 10, 15, 16, 18 and 20). We used a 1 – 5 Likert scale, from “strongly disagree” to “strongly agree”. The components in the positive emotions scale include motivation (Items 1, 6 and 8), pride (Items 11, 13 and 19), confidence (Items 12 and 14), satisfaction (Item 4) and happiness (Item 17). The components of the negative emotions scale are anxiety (Items 2, 7, 10 and 18), embarrassment (Items 9 and 15), frustration (Items 5 and 20), boredom (Item 3) and annoyance (Item 16). The respondents of this research are 112 full-time teachers in SMK Dato’ Usman, Taman Perling. Further details will be discussed in Chapter 4.

1.7 Conclusion

We have provided a general explanation about the lack of research related to teachers’ emotions in teaching proficiency whether in higher or lower education. The background of study, problem statement, research objectives and research questions are also explained in this chapter.

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