

Relationship between Critical Thinking Dispositions, Perceptions towards Teachers, Learning Approaches and Critical Thinking Skills among University Students

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Preparing students to be able to think critically is a goal of many professionals in higher education and also a quality sought by employers of university graduates. Therefore, critical thinking skill is considered an important variable in the process of students' learning. This study attempts to examine the predictive relationships of student characteristics, students' perceptions towards teachers and learning approaches towards critical thinking skills. A questionnaire to measure critical thinking skills will be constructed. Apart from that, three other instruments will be used in gathering data, namely the Critical Thinking Dispositions Inventory (CTDI), the students' perceptions of Teachers' Approaches to Teaching and the Revised Study Process Questionnaire (R-SPQ-2F). Participants will comprise university students from International Islamic University Malaysia (IIUM), University Kebangsaan Malaysia (UKM), University Technology Mara (UiTM) and University of Malaya (UM). The data will be analyzed using statistical method such as alpha Cronbach, principal component analysis, Pearson correlation and structural equation modeling. Results of significant relationships among are variables are expected from the analysis.

Recent investigations in Western Europe and the United States of America show that the level of critical thinking skills among students in higher education is low (Guest, 2000; van Gelder, 2005). In the Malaysian context, the same scenario can be seen. Rosnani and Suhailah (2003) stated that after 11 years of schooling, students are unable to apply the content knowledge acquired in school to real-world problems. Reports from the business sector also indicate the low quality of graduates they receive from the universities who sometimes cannot even comprehend the manual of an equipment, what more the way it works (Rosnani & Suhailah, 2003).

The ability to think critically is important among students in higher education as the content of education at this level requires higher order thinking such as the ability to apply critical evaluation, give evidence for their opinions, and argue the validity of facts they receive from teachers. However, Norris (1985) said that students in higher education do not possess these higher order skills. In other

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words, critical thinking ability is not prevalent among students. Most students do not obtain good scores in tests that measure the ability to identify assumptions, evaluate arguments and make inferences. Paul (1990) also agreed and said that resistance to using critical thinking is prevalent among many higher-education faculties.

Students' ability to think critically has become a major concern among educators and psychologists as they try to study the factors influencing the acquisition of thinking skills. This research therefore focuses on the relationship of several variables, the students' dispositions towards critical thinking, students' perceptions towards teachers' teaching approaches, the learning approaches students employ in the process of learning, and critical thinking skills as the learning outcome.

Literature Review

Critical Thinking Skills

A large body of research provides evidence that college students can experience significant gains in critical thinking. College students have higher critical thinking skills than non-college students (McMillan, 1987; Pascarella, 1989). College experience itself has been shown to increase critical thinking (McMillan, 1987). Critical thinking also increased with education level (King, Wood, & Mines, 1990; Kuhn, 1992; Mines, King, Hood, & Wood, 1990; Onwuegbuzie, 2001; Spaulding & Kleiner, 1992).

Findings have proved that critical thinking is significantly and positively correlated with academic achievement (Jenkins, 1998; Facione, Facione, Blohm, Howard, & Giancarlo, 1998; Collins & Onwuegbuzie, 2000). However, critical thinking is often seen as a universal goal of higher education but is seldom confirmed as an outcome. Therefore, not many studies can be found to relate other variables as predictors of critical thinking skills in educational setting because most studies used academic achievement or GPA as student outcome. However, the positive and significant relationship between critical thinking skills and achievement can be considered an indirect evidence of both critical thinking and academic achievement taking the role of student outcomes.

Relationship between Critical Thinking Dispositions and Critical Thinking Skills

Rimienne (2002) studied the difference of critical thinking skills and critical thinking dispositions when a critical thinking program involving brainstorming, problem-solving, reflexive writing, cooperative learning, discussions and debates were carried out on students. The California Critical Thinking Skills Test (CCTST) measuring critical thinking skills and the California Critical Thinking Dispositions Inventory (CCTDI) measuring critical thinking dispositions were administered to students

prior to the course and again three months later. Findings showed that there was significant increase on all subscales of critical thinking skills and overall CCTST score as the result of the critical thinking program. However, no result on the correlation between critical thinking dispositions and skills was reported.

One study by Giancarlo and Facione (1994) among 193 high school students found a significant positive correlation of $r = .41$ between scores of critical thinking dispositions and critical thinking skills. This correlation between overall critical thinking skill and overall critical thinking dispositions suggests that up to 16.8% of the variance in critical thinking skills test scores is potentially attributable to the differences in students' critical thinking dispositions scores. Another study by Colucciello (1997) also found a significant positive correlation of $r = .32$ among 328 nursing undergraduates.

Facione and Facione (1997) conducted a study on 1557 nursing students using the CCTST and the CCTDI at entry to their college programs. The correlation of the total scores on the CCTST and CCTDI was $r = .20$ ($p < .001$). They again collected at exit from nursing programs in different colleges and universities. Again a positive correlation was found ($r = .17$, $p < .001$). A stronger relationship was also found between the students' disposition score on the CCTDI at program entry and their skills test score on the CCTST at exit ($r = .23$, $p < .001$) (Facione & Facione, 1997).

Relationship between Perceptions towards Teachers and Critical Thinking Skills

Research from the point of view of the students, their preferred teaching characteristics and behaviors, is important as research indicates that students' perceptions and interpretations of the academic environment, affect their approaches to learning most directly, and this in turn affects their learning outcomes (Entwistle & Tait, 1990). This is consistent with Ruggiero (1988) who argued that the explicit teaching of higher-level reasoning and critical thinking did not depend on what was taught, but rather in how it was taught. The only significant change that was required was a change in teaching methodology. Young (1980) also agreed and said that if teachers use appropriate instructional methods and curriculum materials, students will improve their critical thinking skills. Therefore, students' perceptions towards teachers in this research refer to teachers' teaching approaches.

The role of teachers in students' learning is studied from students' perceptions of teachers' teaching approaches. Two teaching approaches are identified, the information transmission/teacher-focused (ITTF) and the conceptual change/student-focused (CCSF). Evidence suggests a direct relationship between teaching approaches with critical thinking skills. For instance, teachers who impart information only do not teach thinking well (Kember, 1997), differences of teaching methodology in student-centred classes rather than instructor-centred classes according to McKeachie's (1970) review promote higher level retention and thinking (e.g., Gibson, 1985; Suksringarm, 1976; Fishbein, 1975; Smith, 1977), and instructional techniques such as having a paper critiqued by an instructor, working

on independent research project, giving a class presentation predict self-reported growth in critical thinking skills (Tsui, 1999).

Teaching approaches also have significant relationship with students' learning approaches. Gow and Kember (1993) constructed a questionnaire to measure teaching conceptions and the final version of the questionnaire revealed two teaching orientations or conceptions that were labeled "learning facilitation" and "knowledge transmission". It was reported that teachers adopting learning facilitation approach is negatively and significantly related with surface approach to learning ($r = -.61, p < .01$) and those teachers adopting knowledge transmission is negatively and significantly related with deep approach to learning ($r = -.74, p < .01$) (Gow & Kember, 1993). Similar results documented the significant relationship between an information transmission/teacher-focused approach to teaching with surface approach and conceptual change/student-focused approach to teaching with deep approach to learning (Trigwell, Prosser, & Waterhouse, 1999; Trigwell, Prosser, Ramsden, & Martin, 1999). Gibbs and Coffey (2004) reported that teachers who increased their conceptual change/student-focused approach to teaching have students using less surface approach to learning.

All the findings indicated significant relationship between an information transmission/teacher-focused (ITTF) approach to teaching with surface approach to learning and between a conceptual change/student-focused (CCSF) approach to teaching with deep approach to learning (Gibbs & Coffey, 2004; Gow & Kember, 1993; Prosser & Trigwell, 1998; Ramsden, 1991, 1992, 1997; Trigwell & Prosser, 1991; Trigwell, Prosser, & Waterhouse, 1999; Trigwell, Prosser, Ramsden, & Martin, 1999). There is a general consensus in higher education that the idea of a student-focused or student-centred approach is an enriching, supporting teaching approach which is more likely to lead to students' intellectual growth (Trigwell, 2002). Therefore, it is important to establish this relationship between teachers' teaching approaches and students' learning approaches in relation to the development of critical thinking skills.

Relationship between Learning Approaches and Critical Thinking Skills

Research has shown that the approaches students employ in their learning influence the learning outcome. Two learning approaches identified in this research are surface and deep approaches to learning. Studies have linked surface approaches with lower order outcomes and deep approaches with higher order outcomes (Entwistle & Ramsden, 1983; Prosser & Millar, 1989; Trigwell & Prosser, 1991; van Rossum & Schenk, 1984). Students can be pushed into surface approaches by the adoption of certain teaching and assessment strategies, but not as readily into deep approaches (Ramsden, Beswick, & Bowden, 1986).

Those students adopting deep approaches to learning were associated with higher quality learning outcomes (Prosser & Millar, 1989; Trigwell & Prosser, 1991; van Rossum & Schenk, 1984), academic performance (Mayya et. al., 2004), and increased knowledge (Murphy & Alexander, 2002). In relation

to critical thinking skills, Gadzella et. al. (1997) found a direct, positive and significant correlation between deep-processing learning and critical thinking skills. Critical thinking skills were also related to students' grades (Gadzella et. al., 1997).

There is no evidence on the direct relationship between students' critical thinking dispositions, learning approaches and critical thinking skills. Yet studies have found significant relationship between critical thinking dispositions and critical thinking skills. One study reported significant difference of learning styles on critical thinking dispositions (Roberts, 2003) and a positive and significant correlation between learning approaches and critical thinking skills (Gadzella et. al., 1997). These studies have found direct relationships between critical thinking dispositions and critical thinking skills, and also between learning approaches and critical thinking skills, but not simultaneously. Therefore, it is important to study the relationship between these three variables simultaneously and explore whether students' learning approaches play the role of mediator in this relationship. It is hypothesized that students with higher scores on critical thinking dispositions are those who adopt deep approach to learning and consequently, will score higher on tests of critical thinking. In contrast, those students having lower scores on critical thinking dispositions will adopt surface approach to learning and in turn, will have lower scores of critical thinking skills.

Theoretical Framework

The conceptual framework of this research is based on the fact that critical thinking skill is one cognitive outcome in the education process, and thus it becomes an important variable in student learning. The acquisition of this skill in the learning process is related to various factors in teaching and learning. The study is structured within the presage-process-product (3P) model of student learning developed by Biggs (1999, 1993) as illustrated in Figure 1.

The conceptual framework of this research follows the same structure in which critical thinking skills as the product variables is the outcome of student presage variables (critical thinking dispositions), teaching presage variable (students' perceptions of teaching approaches), and the process variable (surface and deep learning approaches).

Conceptual Framework

From the presage-process-product (3P) model for teaching and learning (Biggs, 1993), a conceptual framework has been constructed for the present study as shown in Figure 2. By using the presage-process-product model, the relationship between students' critical thinking dispositions (student presage variables), teachers' teaching approaches (teaching context presage variables), learning approaches (process variables), and critical thinking skills (product variables) will be investigated. The conceptual framework is illustrated in Figure 2.

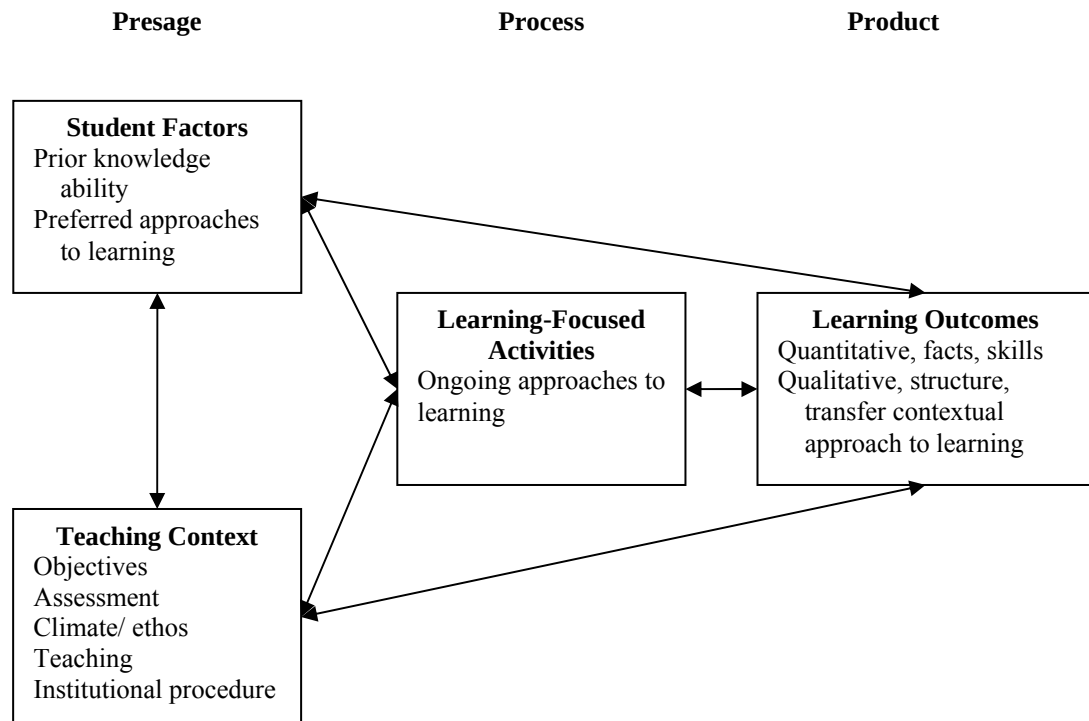


Figure 1. The “3P” model for teaching and learning.

Source: Biggs, 1993.

Research Hypotheses

The hypotheses for this research are as follow:

- H1: Students’ critical thinking dispositions will be positively and significantly related with critical thinking skills.
- H2: Teachers’ teaching approaches will be significantly related with critical thinking skills.
- H3: Students’ learning approaches will be significantly related with critical thinking skills.
- H4: There is an indirect relationship between critical thinking dispositions and critical thinking skills through learning approaches.
- H5: There is an indirect relationship between teaching approaches and critical thinking skills through learning approaches.

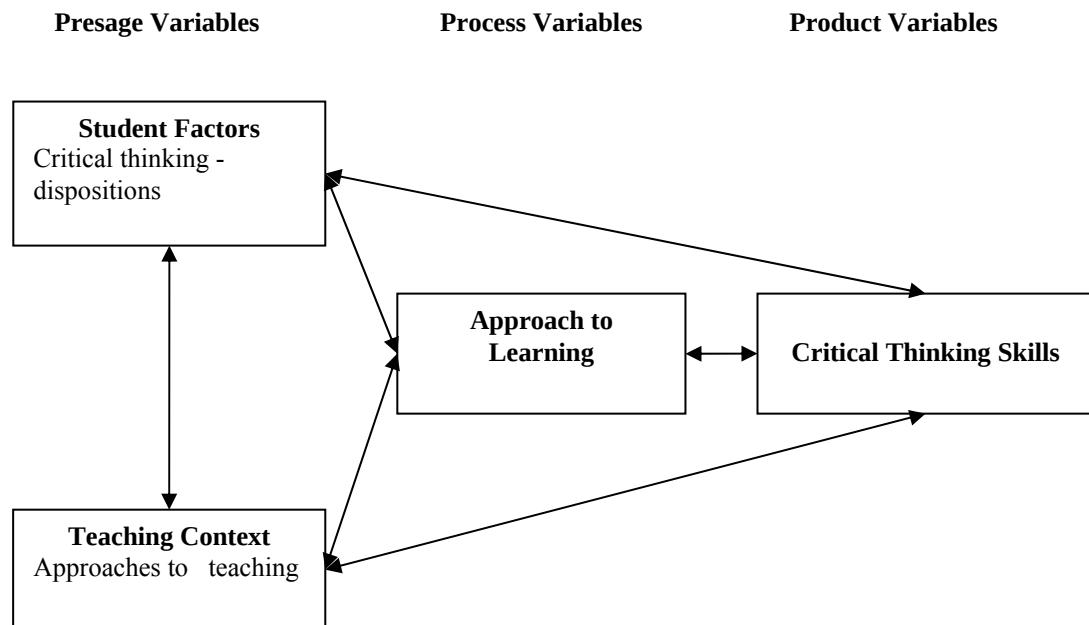


Figure 2. A Conceptual framework for examining the relationship of student and teacher variables on student's critical thinking skills.

Methods

Participants

The participants of this study will involve 360 undergraduate and graduate students in higher educations in Klang Valley, Malaysia. Several universities will be chosen such as Universiti Kebangsaan Malaysia (UKM), Universiti Teknologi Mara (UiTM), International Islamic University Malaysia (IIUM) and University Malaya (UM). The participants will be chosen according to year of study in which 30 students will be randomly selected for each Year 1, Year 2 and Year 3 from all the universities.

Instruments

Four instruments will be administered to participants. The researcher will also include questions on participants' demographic profile such as gender, age, academic major and latest CGPA. The instruments which will be used are:

1. The Critical Thinking Disposition Inventory (CTDI): The Critical Thinking Disposition Inventory (CTDI) is adapted from the California Critical Thinking Dispositions Inventory

(CCTDI). The original CCTDI consists of 75 Likert-type items measuring seven dispositions, namely truth-seeking, open-mindedness, analyticity, systematicity, inquisitiveness, self-confidence and maturity. The developers report an overall reliability, Cronbach alpha of 0.90 and scale reliability ranging from alpha 0.72 – 0.80 (Facione, 1990). The inventory for this research however, will use the seven thinking dispositions as the CTDI and comprises 70 items, with 10 items for each scale.

2. The Student Perception of Approach to Teaching Inventory (ATI): The Approaches to Teaching Inventory is an instrument designed to capture qualitative differences in teachers' approaches to teaching. It has two scales, the Conceptual Change/Student-Focused (CCSF) approach scale, and the Information Transmission/Teacher-Focused (ITTF) approach scale. Scale reliabilities (Cronbach's alphas) for the ITTF and CCSF scales are .73 and .75 respectively (Trigwell & Prosser, 2004).
3. Revised Study Process Questionnaire (R-SPQ-2F): The SPQ consists of 20 items with two deep and surface factors each with 10 items. Biggs et. al. (2001) reported Cronbach alpha coefficients ranging from .57 to .72 for the subscales.
4. The Malaysian version of Critical Thinking Test (MCTT): From the theoretical framework and literature in critical thinking, five constructs have been identified to measure the cognitive skills of critical thinking which are: analysis, inference, deduction, interpretation and argument evaluation. The test constructed will consist 100 items with 20 items for each subscale. The response format uses a true or false format.

Procedures

Four questionnaires will be administered; the CTDI, ATI, R-SPQ-2F, and the MCTT. The researcher will give instructions to participants in answering all questionnaires. After the questionnaires have been completed, they will be collected and keyed in the computer using Statistical Package for Social Sciences (SPSS).

Data Analysis

The data will be analysed using SPSS. Both descriptive and inferential analyses will be done. Hypotheses will be tested using structural equation modeling (SEM). Goodness of fit of model will be analysed by SEM with the AMOS program (Arbuckle, 1999).

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