



The Relationship between Mother Tongue, Age, Gender and Critical Thinking Level

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Abstract

Critical thinking is an intellectually disciplined process of actively and skilfully conceptualising, applying, analysing and evaluating information gathered from or generated by observation, experience, reflection, reasoning or communication, as a guide to belief and action. To accomplish these critical thinking actions good language ability is crucial. Vygotsky revise great importance to the link between the development of language and critical thinking. This is a correlational research in which 30 MA Students of Azad University of Shiraz branch were selected as participants. California Critical thinking skills questionnaire was used to collect the data in this research. Results indicated that there is significant relationship between mother tongue and critical thinking level, but there is no significant relationship between age, gender and critical thinking level.

Keywords: age, gender critical thinking level, mother tongue

INTRODUCTION

The intellectual roots of critical thinking refer to 2500 years ago when Socrates established the importance of seeking evidence, examining reasoning and assumptions, and analyzing basic concepts. His method of questioning which is now called “Socratic Questioning” is the best known teaching strategy for critical thinking (Paul, Elder, & Bartell, 1997). The description of critical thinking is derived from the works of various scholars such as Ennis (1985), Lipman (1988), Facione (1990), Paul (1993), and Scheffer and Rubenfeld (2000).

Various definitions and descriptions have been proposed for critical thinking, indicating a lack of consensus on how it is best defined and what critical thinking skills can and should be taught. Kurfiss (1988) defined it as “an investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that can therefore be convincingly justified” (p. 20). Kurfiss (1988) suggests that the outcomes of critical

thinking usually appear in the form of argument and are twofold: a conclusion and the justification offered in support of it.

Philosopher Richard Paul and educational psychologist Linda Elder have written extensively on the subject of critical thinking. Paul (1993) defined it as "thinking about your thinking while you are thinking in order to make your thinking better: clearer, more accurate, or more defensible" (p. 462). "Thinking about your thinking" is a form of reflection with which critical thinkers can engage in disciplined and self-directed thinking. Paul and Elder (2001) further described critical thinking as the "mode of thinking - about any subject, content, or problem - in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them" (p. 1). Paul and Elder (2001) believe that critical thinkers need sound criteria and standards for assessing their own thinking. Moreover, critical thinkers have the elements of reasoning, traits of reasoning, and reasoning standards. In Scriven and Paul's (2004) view, critical thinking is a process, not an end.

It is the "intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from or generated by: observation, experience, reflection, reasoning, or communication, as a guide to belief and action" (p. 1).

Facione (1990) defines critical thinking within the philosophical approach. He states that critical thinking is

"purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based" (p. 3).

Ennis (1985) defines critical thinking as "reflective and reasonable thinking that is focused on deciding what to believe or do" (p. 45). His definition includes both practical activities (making reasoned decisions) and creative activities (formulating hypotheses, questions, alternatives, and plans for experiments). In the Handbook of Critical Thinking Resources by Peirce (2005), critical thinking is defined as "sound thinking needed by practitioners in an academic discipline: accurate, relevant, reasonable, rigorous—whether it be analyzing, synthesizing, generalizing, applying concepts, interpreting, evaluating supporting arguments and hypotheses, solving problems, or making decisions" (p. 3). Lipman (1988) further defines critical thinking as "skillful, responsible thinking that facilitates good judgment because it (1) relies upon criteria; (2) is self-correcting; and (3) is sensitive to context" (p. 39). Critical thinking as the above-mentioned definitions suggest, can be defined and learned as a teachable practice.

LITERATURE REVIEW

Critical thinking skills and metacognition

Meta-cognition is defined as “the monitoring and control of thought” (Martinez, 2006, p. 696), and metacognitive strategies are defined as “actions which go beyond purely cognitive devices, and which provide a way for learners to coordinate their own learning process” (Oxford, 1990, p. 136). Olson and Astington (1993) were among the researchers who studied cognitive development and the link between metacognition and critical thinking. They believe that the development of metacognitive understanding is important for critical thinking skills. Those with high levels of metacognitive skills have conscious control over their own beliefs in the face of external events, and know how to think and justify their beliefs.

In Kuhn’s (1992) view, critical thinking is a form of meta-cognition which involves metacognitive knowing (thinking that operates on declarative knowledge), meta-strategic knowing (thinking that operates on procedural knowledge), and epistemological knowing (encompassing how knowledge is produced) (Lai, 2011). Likewise, Willingham (2007) argues that “a component critical thinking skill is the ability to deploy the right strategies and skills at the right time, typically referred to as conditional or strategic knowledge and considered part of the construct of meta-cognition” (as cited in Lai, 2011, p. 19). Similarly, Halonen (1995) and Halpern (1998) identified meta-cognition as the ability to monitor strategy use and critical thinking quality. At the very least, meta-cognition can be considered as a supporting condition for critical thinking where it is more likely that one engages in higher-order thinking skills.

Critical thinking skills and emotional intelligence

It is generally believed that thought and emotions are two separate issues. But, the fact is that sometimes human feelings are based on certain levels of thinking and sometimes his thoughts are the result of his emotions. Critical thinkers believe that their reactions to certain situations will result in emotions, and they know that if they have enough understanding about those situations their emotions will be different (Haghani, Aminian, Kamali, & Jamshidian, 2010). In order to have a highly rational life one must take into account both affective and cognitive dimensions of the mind. According to Elder (1996), critical thinking can guide our beliefs and actions by assessing our cognitive abilities and emotions. Elder further stated that “critical thinking, enables us to form sound beliefs and judgments and in doing so, provides us with a basis for a ‘rational and reasonable’ emotional life” (p. 2). Thus, a necessary condition for high quality reasoning and problem solving ability is the affective dimension of mind which includes feelings and volition.

The role of emotions in learning to use critical thinking is a complicated issue, which needs to be further investigated by the scholars. Moon (2008) emphasized on the role of emotions, language, and curiosity in critical thinking, and believed that emotions might

affect the process of critical thinking and the way we work with the materials of learning. According to Elder (1996), critical thinking can direct our beliefs and actions successfully provided that it continuously assesses not only our cognitive abilities, but also our feelings. Critical thinking can:

- Provide a link between intelligence and emotions in the “emotionally intelligent” person;
- Bring intelligence to bear upon our emotional life;
- Enable us to take active command of not only our thoughts, but our feelings as well;
- Provide us with the mental tools needed to explicitly understand how reasoning works, and how those tools can be used to take command of what we think, feel, desire, and do (Elder, 1996, p. 2).

Critical Thinking Background

It is widely believed that Socrates was the first person to establish the idea of thinking critically and tried to make people explain and answer by posing valid questions (Paul, Elder, & Bartell, 1997). Plato, who recorded most thoughts and beliefs of Socrates, stepped on Socrates' path and were admired for his efforts to encourage independent thinking (Carroll, 2004). Later, Aristotle emphasized on this idea that things are often different from what they appear to be and formed the basis for the Greek skeptics. They were renowned for their disbelief and their skeptic attitude towards knowledge, facts, or opinions/beliefs stated as facts, or doubt regarding claims that are taken for granted elsewhere.

During these ancient times, scholars and philosophers were trying to enlighten people's minds and engage them in examining and challenging the assumptions and developing a more critical understanding about power, privilege, and change. Thomas Aquinas was the main thinker and scholar to develop critical thinking in Europe during dark years of the Middle Ages; the tradition of systematic CT was embodied in his writings and teachings (Paul, Elder, & Bartell, 1997). According to Paul, Eder, and Bartell (1997) Robert Boyle (in the 17th Century) and Sir Isaac Newton (in the 17th and 18th Century) are among the scholars who attended the issue of critical thinking and believed in sound reasoning and empirical evidence.

In the eighteenth century by the emergence of the industrial revolution and with the help of some prominent thinkers and philosophers, our conception of critical thought moved even further and led to developing our sense of the power of critical thinking and its tools. During the 19th century critical thinking found its way into other fields of practice, language included. Paul and Elder (2006) mentioned that applying critical thinking to language can lead to the field of Linguistics and a deep probing of the functions of symbols and language in human life.

During the 20th Century, we got to a much clearer and more explicit understanding of the nature and power of critical thinking. In addition, by the beginning of 21st century,

CT has attracted countless attention and has become an educational ideal in the eyes of most policy makers and educational planners (Ennis, 2008; McBride, Xiang, Wittenburg, & Shen, 2002; Stapleton, 2011).

METHODOLOGY

Participants

Thirty MA students studying at Azad University of Shiraz branch were selected as the participants of this research. Seventeen students were male and 13 students were female.

Instrument

California Critical thinking skills questionnaire was used to collect data in this research. This questionnaire includes 34 questions in Likert form in five fields of cognitive skills of critical thinking (analysis, evaluation, inference, logic induction and deduction) which is designed for specific assessment of critical thinking skills. Reliability of this questionnaire was calculated by Kuder Richardson test as 0.79.

Data Collection Procedure

Students are given one positive score for each correct question. Total scores of correct questions form their score in critical thinking. Students have 45 minutes to answer the questions. Reliability and validity of this questionnaire were calculated. Accordingly, Critical Thinking Test was done among students to answer the following questions:

- Which categories of age, gender, and mother tongue has relationship with critical thinking?

Data Analysis Procedure

Age, gender, and mother tongue were considered as independent variables. Scores gained by California Critical thinking skills questionnaire were considered as dependent variables. Regression analysis method was considered in this research. SPSS was used for descriptive and inferential analysis in this research.

RESULTS

The first hypothesis is that there is significant relationship between independent variables and dependent variables, but there is no relationship among independent variables. Before interpreting results of regression analysis, we consider some hypotheses. The first one is multiple times linear which considers strong relationship between predictor variables. Correlation between predictor variables and dependent variables are shown in table 1.

Table 1. Correlation between predictor variables and dependent variables

Correlation type	California Critical thinking skills	Mother tongue	Gender	Age
California Critical thinking skills test	1.00	0.36	0.44	- 0.56
Mother tongue	1.00		0.20	-0.19
Gender			1.55	-0.36
Age				1.00

Accordingly, there is relationship between California Critical thinking skills test and independent variables, although not so much. To ensure multiple linear time do not change results of regression analysis, another statistics is used. SPSS was used for this purpose. Table 2 shows total average, and standard deviation of variables.

Table 2. descriptive statistics of Critical thinking test

Variables	Mean	SD	Number
Critical thinking test	2080	4221	30
Analysis	410	1029	30
Deduction	493	1048	30
Interpretation	107	0.365	30
Self - Monitoring	290	0.305	30
Assessment	507	1999	30
Description	270	0.952	30

Actually, this table shows the measured factors to determine Critical thinking level.

Table 3. regression test analysis

Model	Factor B	Standard coefficients		Standard coefficients		Linear diversity statistics	
		Estimated standard error	Factor β	Index T	Sig	Allowable error	Variance inflation factor
Fixed	27.046	4.466		6.057	0.00		
Mother tongue	-3.390	1.503	- 0.407	-2.256	0.033	0.942	1.061
Gender	1.385	1.862	0.141	0.463	0.463	0.845	1.169
Age	1.879	1.577	- 0.226	- 1.192	0.244	0.846	1.169

In the sample, amounts of all three independent variables (mother tongue, gender, and age) are acceptable respectively as 0.942, 0.845, and 0.856. Accordingly, multiple linear was violated.

Table 4. Summary model of multiple regression analysis

Model	Correlation	Solidarity Square	Standardized squared correlation	The estimated predicted standard error
1	0.448	0.201	0.108	3.986

Table 5. Analysis of variance of differences

Model	Sum of squares	Freedom Degree	Root Mean	F	Sig
Regression	103.687	3	34.562	2.175	0.005
Difference	413.113	26	15.889		
Sum	518.800	29			

The linear of regression model is shown in table 5. When F amount is smaller than 0.05, it is concluded that independent variables work well in explaining dependent variable. According to table 5, there is suitable fit for this model because its amount is 0.005 which is smaller than 0.05. This F amount is important which shows that regression model is linear. After checking the model, we are going to know importance of each independent variable in predicting dependent variable.

Table 6. Data regression coefficients

Model	Non-standardize coefficients		standardize coefficients		Linear diversity statistics		
	B coefficient	Estimated standard error	β coefficient	T index	Sig	Allowable error	VIF Inflation dispersion agents
Fixed	27.046	4.466		6.057	0.00		
Mother tongue	-3.390	1.503	- 0.407	-2.256	0.033	0.942	1.061
Gender	1.385	1.862	0.141	0.463	0.463	0.845	1.169
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Initially, we study on β coefficient under standardize coefficients. To compare different variables, paying attention to standardize coefficients is very important, not to non-standardize coefficients. The largest β coefficient is - 0.407 indicates this variable i.e. mother tongue provides the most usefulness in explaining dependent variable when a variance is described by other variables in this model is controlled. Age and gender impact significantly on the dependent variable after mother tongue. In addition, we study on sig amounts column. These amounts show us if the variable impact significantly in this equation or not. In this study, mother tongue amount is 0.033 which is smaller than 0.05 and is meaningful. But age (sig.0.244>0.05) or sex (sig.0.463>0.05) are not so. It shows it has no significant impact on results of critical thinking test.

This amount is useful in identify the relative importance of each variable in the model. According to the appropriate predictor variables, t-amount should be more than 2 or less than -2. In this study, only mother tongue is a suitable predictor for CCTST, but gender (t=0.744) and age (t=1.192) cannot predict CCTST in this model.

DISCUSSION AND CONCLUSION

Everyone thinks; it is our nature to do so. But much of our thinking is biased and partial. Yet the quality of our life and as the result what we do, depends on the quality of our thoughts. So, thinking effectively is an everyday activity. When someone is told and forced to decide about something new thinking deeply is required and asking how and

why, are the first steps of making a good decision process. Life can be described as a sequence of problems that everyone must solve his or her own ones. Thinking is undeniable part of human's life.

Critical thinking has been one of the hottest issues since the times of ancient Greece. Paul et al., (1997) assert that thinking intellectually refers to the teaching practice and vision of Socrates 2500 years ago who discovered that people could not rationally justify their confident claims to knowledge. He established the importance of asking deep questions that probe profoundly into thinking before we accept ideas. His method of questioning is known as "Socratic Questioning" and is the best-known critical thinking teaching strategy. He highlighted the need in thinking for clarity and logical consistency.

Goal of this investigation included a study on finding significant relationship between mother tongue, age, and gender with critical thinking level. For gaining this goal, the scores attained by students in critical thinking test and three dependent variables including mother tongue, age, and gender were studied by multi-linear regression. According to results of this investigation, there is significant relationship between mother tongue and critical thinking level, but there is no significant relationship between age, gender and critical thinking level.

Critical thinking is an everyday activity; whenever we want to make a decision, we go through a thinking process. Critical thinking is about asking questions. Critical thinking issue has been growing rapidly for some years. In each concept, we deal with in language learning and teaching the trace of it is obvious. Moon (2008) asserts that critical thinking and its relationship to the educational process has become a central issue and it is time to explore the term. She adds since critical thinking is a process, which is involved in any research activity: it can be considered as a principal concept to education, especially at higher levels; in fact, it is fundamental goal of learning.

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