



## Practical State of Critical Thinking Skills of Da Nang High School Students

Doan Pham Quynh Trang<sup>1</sup>, Le Nhat Quang<sup>2</sup>, Nguyen Thi Thuy Diem<sup>3</sup>

<sup>1,2,3</sup>Phan Chau Trinh High School, Da Nang, Vietnam

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Corresponding Author:  
**Doan Pham Quynh  
Trang**

### ABSTRACT

Critical thinking has been the goal of education for centuries. According to World Economic Forum, critical thinking is the most important skill of workers. The modern educational environment in this digital age is equipped with smart devices and software to help develop students' thinking and stimulate creativity. Students will have access to many sources of knowledge and rich cultures. Thus, students need to construct new knowledge independently, build their own opinions, have the ability to evaluate and refute facts, opinions, and events in a scientific and creative manner, actively attain and master scientific knowledge, etc. Especially in the current trend of globalization and information explosion, it is no longer appropriate for students to passively accept the views given by teachers without consideration. The development of critical thinking for students in schools has become extremely necessary.

*The Research about the Practical State of Critical Thinking Skills of Da Nang High School Students* is a project to approach the above trend, this study will focus on surveying the current situation and level of critical thinking skills of high school students in Da Nang City, and from there proposes some measures to support the improvement of appropriate critical thinking skills.

**KEYWORDS:** Skill, critical thinking, students, high school

### 1. INTRODUCTION TO THE RESEARCH TOPIC

Critical thinking skills climbed from the 4<sup>th</sup> position (2015) to the second position (2020) in the most important skills in the 21<sup>st</sup> century that people need (according to the World Economic Forum). In addition, the new 2018 General Education Program has changed the teaching goal from imparting knowledge to developing students' qualities and abilities. All these objective factors have posed for us the question on how to best prepare our students to be proactive and confident facing the massive amount of knowledge, and form their own capacity to adapt to new learning and world development trends in this information age? This *Research about the Practical State of Critical Thinking Skills of Da Nang High School* will focus on surveying the current situation and level of critical thinking skills of high school students in Da Nang City, and from there proposes some measures to support improvement of appropriate critical thinking skills.

### 2. ORGANIZATION AND RESEARCH METHODOLOGY

The study's survey was carried out at a number of high schools in Da Nang City. The study population included 317 students: 97 students were in grade 10 (30.6%), 26 students were in grade 11 (8.2%), 194 students were in grade 12

(61.2%), of which there were 70 male students (22.1%) and 247 female students (77.9%).

- This study uses a system of research methods, including: document review, survey by questionnaires, and statistical analysis. The critical thinking skills of high school students are assessed through a 5-level Likert scale: very bad (1 point), bad (2 points), average (3 points), good (4 points), very good (5 points) with the following contents:

+ Awareness of critical thinking skills (concepts and demonstration).

+ Component skills include: interpretation skills (4 items), analytical skills (6 items), inference skills (5 items), evaluation skills (5 items), explanation skills (4 items), and self-regulation (4 items).

+ Students' emotions and attitudes in debate activities

The scale of critical thinking skills of high school students has been tested for reliability, the Cronbach's Alpha is from 0.732 to 0.849. It shows that the scales have good reliability, the total correlation coefficient of all observed variables is more than 0.3, so none are omitted.

The validity of the skill scale is proved by Pearson correlation analysis between the independent variables, the results are as follows: all Sig coefficients are less than 0.05 to ensure statistical significance, the correlation coefficient

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between all observed variables are positive, which proves that the variables are linearly correlated with each other, R fluctuates from 0.267 to 0.56.

We classify the level of students’ critical thinking skills based on the mean and standard deviation of the sample group.

### 3. RESEARCH RESULTS

#### 3.1. Concept and structure of critical thinking skills

Critical thinking skill is the ability to apply knowledge and experience to interpret, analyze, infer, evaluate, explain, and self-regulate a problem based on standards before reaching a conclusion or decision to effectively solve the problem posed.

Critical thinking skills manifest in various aspects:

+ Students’ awareness on critical thinking skills (concepts and demonstration).

+ Interpretation: Know how to classify and clarify the meaning of certain situations, topics, or data;

+ Analysis: Able to check the accuracy of ideas; identify causes and goals;

+ Inference: Infer, look for evidence; propose a logical, convincing conclusion or offer an alternative to a disproved result;

+ Evaluation: Able to assess the reliability of statements and the quality of arguments;

+ Explanation: Prove results, debate about the procedures and presented results;

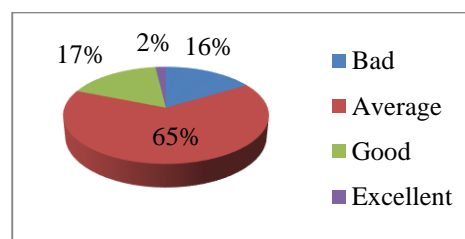
+ Self-regulation: Self-assess and adjust.

+ Student’s emotions and attitudes

#### 3.2. Practical state of critical thinking skills of Da Nang high school students

##### 3.2.1. Level of students’ critical thinking skills

The level of critical thinking skills of Da Nang high school students is determined through descriptive statistics. The results show the mean  $M=1.88$ , standard deviation  $SD=0.34$ ,  $min=0.75$ , and  $max=2.72$ .



**Figure 1:** Level of students’ critical thinking skills

Figure 1 shows that regarding analytical thinking skills, 16% of students are weak, 65% are average, 17% are good, and only 2% are excellent. The results show that the analytical thinking skills of high school students in Da Nang are at an average level.

**Table 1:** Average score of all aspects of critical thinking skills in students

Ord.	Aspect	Mean (M)	St. Dev. (SD)	Level
1	Awareness	0.475/1	0.18	Average
2	Interpretation	3.30/5	0.62	Average
3	Analysis	3.32/5	0.62	Average
4	Inference	3.29/5	0.64	Average
5	Evaluation	3.33/5	0.64	Average
6	Explanation	3.33/5	0.69	Average
7	Self-regulation	3.48/5	0.68	Average
8	Emotions and attitudes	3.72/5	0.617	Excellent
<b>Critical thinking skills</b>		<b>1.88</b>	<b>0.34</b>	<b>Average</b>

The results of Table 1 show that students’ awareness of critical thinking skills is average ( $M=0.475$ ). The component skills are relatively equal, there is little difference ( $M$  range from 3.29 to 3.48), self-regulation is the best ( $M=3.48$ ), the worst is inference ( $M=3.29$ ). The emotions and

attitudes of students when performing critical thinking skills are excellent ( $M=3.72$ ).

Critical thinking skills’ levels of students of different learning ability groups are shown in Table 2:

**Table 2:** Average score of critical thinking skills by academic achievement

Academic achievement	N	Mean (M)	Std. Dev. (SD)
Average – Good	96	1.81	0.35
Excellent	221	1.91	0.34

( $<1.54$ -Bad;  $1.54 \leq x \leq 2.22$ -Average;  $2.22 < x \leq 2.56$ -Good;  $>2.56$ - Excellent)

Analysis from the Independent Samples t-Test to examine the average difference in thinking skills of students

in different academic groups produces the coefficient  $Sig = 0.025 < 0.05$ , this result shows that there is a statistically

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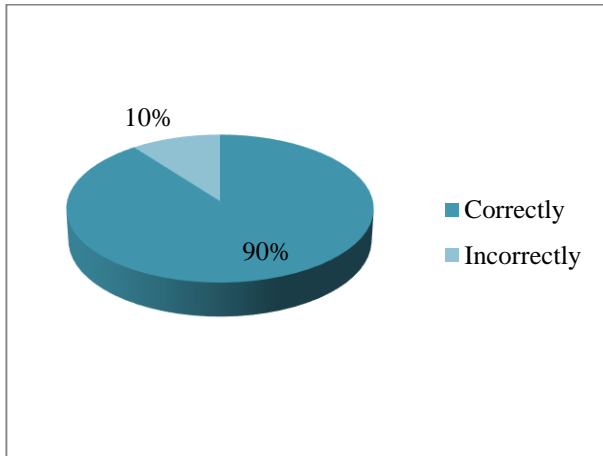
significant difference in the analytical thinking skills of students with different academic achievement, students with excellent academic performance have better critical thinking skills than those with good and average ability. This result is similar to the study of Dehghani (2011) and Malahayati (2014).

### 3.2.2. Demonstration of students’ critical thinking skills

#### 3.2.2.1 Students’ awareness of critical thinking skills

##### a. Concept

The levels of understanding of Da Nang high school students about the concept of critical thinking skills are shown in Figure 2:



**Figure 2:** Students’ awareness about the concept of critical thinking skills

The data in Figure 2 shows that 284 students (90%) answer correctly, the remaining 33 students (10%) answer incorrectly, which proves that the majority of high school students in Da Nang have a correct understanding about the concept of critical thinking skills.

#### 3.2.2.2. The demonstrative levels of the component skills of critical thinking skills

##### a. Interpretation skills

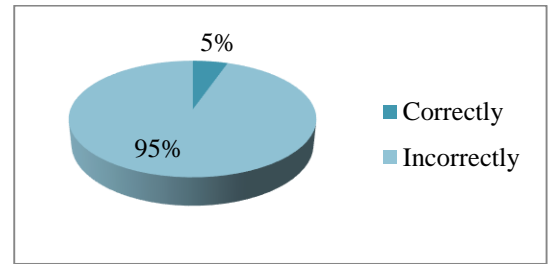
**Table 3:** Students’ interpretation skills (n = 317)

Ord.	Demonstration	Mean (M)	Std. Dev. (SD)	Rank
1	Clarify the meaning of certain situations, topics, or data	3.30	0.759	2
2	Present information in a more understandable way	3.38	0.835	1
3	Ask questions to clarify the information or argument of the given issue	3.29	0.866	3
4	Know how to classify data by topic	3.27	0.883	4

(1-Very bad; 2-Bad; 3-Average; 4-Good; 5-Very good)

While interpreting an issue, most students do well in “presenting information in a more understandable way” (M=3.38) and “clarifying the meaning of certain situations, topics, or data” (M=3.30); however, the majority of them do not yet “know how to classify data by topic” (M=3.27). In fact, students are able to restate information in their own language

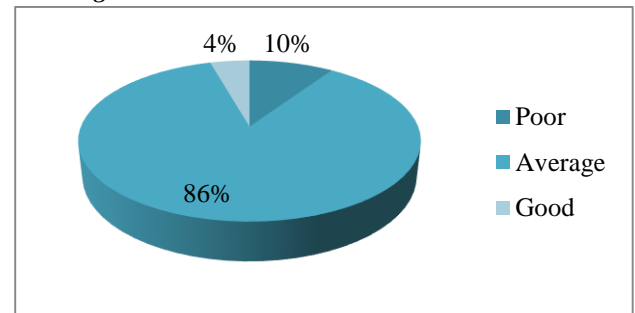
##### b. Demonstration



**Figure 3:** Students’ awareness about the demonstration of critical thinking skills

The data of Figure 3 shows that very few students (5%) are correctly aware of the demonstration of critical thinking skills while most of them (95%) are incorrectly aware of the demonstration.

##### c. Overall assessment of students’ awareness of critical thinking skills



**Figure 4:** Awareness of critical thinking skills

The research results show that 10% of high school students have poor awareness of critical thinking skills, 86% are average, and only 4% are good. Therefore, it is necessary to take measures to raise students’ awareness about this issue.

or paraphrase to clarify a topic, but are confused when classifying data by topic. For example, when the teacher asks students to classify Vietnamese poetry in the 1945-1975 period, they have not yet provided criteria for classification such as time, content, and genre. The difficulty in classifying data stems from their ability to determine criteria.

**b. Analytical skills**

**Table 4:** Students’ analytical skills (n = 317)

Ord.	Demonstration	Mean (M)	Std. Dev. (SD)	Rank
1	<i>Identify the cause and objective of the problem</i>	3.55	0.784	1
2	<i>Analyze the collected information</i>	3.37	0.763	3
3	<i>Select and arrange appropriate information as evidence to support the discussed issue</i>	3.35	0.839	4
4	<i>Break down a complex problem into simpler problems</i>	3.13	0.845	5
5	<i>Try to understand the reason behind each problem</i>	3.54	0.817	2
6	<i>Recognize the structure of an argument</i>	2.98	0.903	6

(1-Very bad; 2-Bad; 3-Average; 4-Good; 5-Very good)

When analyzing a problem, students are able to “*identify the cause and objective of the problem*” (M=3.55) and always “*try to understand the reason behind each problem*” (M=3.54). However, they have not yet “*recognized the structure of an argument*” (M=2.98). In Literature, when the teacher asks to determine the cause/objective of the

problem (for example, determining the purpose and target audience of the *Declaration of Independence*), the students perform quite well, but once they are asked to analyze Ho Chi Minh’s argument structure in the Declaration, they seem to have a lot of trouble in doing so.

**c. Inference skills**

**Table 5:** Students’ inference skills (n = 317)

Ord.	Demonstration	Mean (M)	Std. Dev. (SD)	Rank
1	<i>Propose a logical conclusion</i>	3.37	0.784	2
2	<i>Offer an alternative to the rejected result</i>	3.32	0.821	3
3	<i>Based on personal information and knowledge, make inference and assumptions about how to solve problems</i>	3.39	0.837	1
4	<i>Build a system of results drawn from the problem’s data</i>	3.15	0.790	5
5	<i>Identify the holes in the opponent’s argument</i>	3.25	0.885	4

(1-Very bad; 2-Bad; 3-Average; 4-Good; 5-Very good)

In the process of thinking, students can “*propose a logical conclusion*” (M=3.37) and “*based on personal information and knowledge*”, they can “*make inference and assumptions about how to solve problems*” (M=3.39) very well; however, their ability to “*build a system of results drawn from the problem’s data*” (M= 3.15) and “*identify the holes in the opponent’s argument*” (M=3.25) is still limited. In fact,

when the teacher asks students, based on the information of the Declaration of Independence (Ho Chi Minh), to tell when the declaration of independence of a country is recognized by the world, the majority of them cannot answer. This shows that their ability to draw consequences from available information is not good.

**d. Evaluation skills**

**Table 6:** Students’ evaluation skills (n = 317)

Ord.	Demonstration	Mean (M)	Std. Dev. (SD)	Rank
1	<i>Assess the credibility of an argument</i>	3.33	0.742	3
2	<i>Assess the quality of arguments and evidence</i>	3.24	0.774	5
3	<i>Provide one’s own opinion with evidence</i>	3.36	0.859	2
4	<i>Draw conclusions scientifically</i>	3.27	0.820	4
5	<i>Make decisions that are appropriate with the individual and the context</i>	3.48	0.859	1

(1-Very bad; 2-Bad; 3-Average; 4-Good; 5-Very good)

Regarding evaluation skills, students can “*make decisions that are appropriate for themselves and the context*” (M= 3.48) and “*provide their own opinion with evidence*” (M=3.36) very well; nevertheless, they still have difficulties in “*assessing the quality of arguments and evidence*”

(M=3.24) and “*drawing conclusions scientifically*” (M=3.27). 13.9% of students surveyed are at a very bad level in assessing the quality of arguments and evidence and 14.5% are at a bad level when drawing conclusions scientifically. When asked to assess the quality of other students’ arguments and evidence,

or to evaluate the science of an argument, students appear extremely baffled.

**e. Explanation skills**

**Table 7:** Students’ explanation skills (n = 317)

Ord.	Demonstration	Mean (M)	Std. Dev. (SD)	Rank
1	<i>Able to explain the results presented</i>	3.28	0.788	2
2	<i>Able to use words clearly and precisely</i>	3.17	0.921	4
3	<i>Focus on listening to other people’s arguments to provide positive, constructive feedback</i>	3.66	0.837	1
4	<i>Clarify the strengths and weaknesses of an argument</i>	3.25	0.906	3

(1-Very bad; 2-Bad; 3-Average; 4-Good; 5-Very good)

While explaining, students perform well in “focusing on listening to other people’s arguments to provide positive, constructive feedback” (M=3.66). However, they are still limited in the “ability to use words clearly and precisely” (M=3.17), and their ability to “clarify the strengths and weaknesses of an argument” is also not good (M=3.25).

21.2% of students have problems with using words in debates, students are confused in finding the right words to express their thoughts, they keep repeating words or lack fluency in terms of not only language ability and communication skills but also their confidence in front of the crowd.

**f. Self-regulation**

**Table 8:** Students’ self-regulation (n = 317)

Ord.	Demonstration	Mean (M)	Std. Dev. (SD)	Rank
1	<i>Identify strengths and weaknesses in one’s own argument</i>	3.36	0.894	4
2	<i>Adjust one’s own perspective and viewpoint</i>	3.50	0.790	2
3	<i>Attempt to view things differently</i>	3.43	0.852	3
4	<i>Not jump to conclusions when there is no solid basis</i>	3.65	0.894	1

(1-Very bad; 2-Bad; 3- Average; 4-Good; 5- Very good)

During debates, students do “not jump to conclusions when there is no solid basis” (M=3.65) and they can “adjust their own perspective and viewpoint” (M=3.5). Not jumping to conclusions without a solid basis is a positive sign of cognitive maturity in high school students. Other demonstrations of “adjusting one’s own perspective and viewpoint” and “attempting to view things differently” have a close relationship with the above demonstration, showing the self-regulation ability of high school students. However,

students’ ability of “identifying strengths and weaknesses in one’s own argument” (M=3.36) is not good. In order to improve self-regulation, students need to know how to identify weaknesses and strengths in their own arguments, and consciously overcome their weaknesses to make more scientific arguments.

Specific difficulties when performing critical thinking skills are the basis for us to develop appropriate support exercises.

**3.2.2.3. Student’s emotions and attitudes**

**Table 9:** Students’ emotions and attitudes during debate activities (n = 317)

Ord	Demonstration	Mean (M)	Std. Dev. (SD)	Rank
1	<i>Put effort into or attempt to state ones’ own perspective and point of view</i>	3.41	0.854	6
2	<i>Have a pure motive and desire to clarify the problem</i>	3.62	0.798	4
3	<i>Respect others when debating</i>	4.02	0.844	1
4	<i>Accept suggestions and adjust one’s own views when receiving positive feedback from others</i>	3.92	0.787	2
5	<i>Accept innovation that is outside the traditional norms and current views</i>	3.81	0.771	3
6	<i>Maintain composure during the debate</i>	3.59	0.959	5

(1-Very bad; 2-Bad; 3- Average; 4-Good; 5- Very good)

During debates, students have positive attitudes of “respecting others when arguing” (M=4.02), they know how

to “accept suggestions and adjust their own views when receiving positive feedback from others” (M=3.92) and



“accept innovation that is outside the traditional norms and current views” (M=3.81). This is a good sign about the emotions and attitudes of students when debating. The results show that students have the ability to control their emotions and attitudes and demonstrate objective and progressive qualities of critical thinking, showing curiosity and eagerness to learn to move towards development. Criticism does not mean being conservative with your own opinion to refute others, but learning how to look towards the truth, knowing how to look at things in a different direction and accepting to change your own perspective. Criticism does not mean refuting others to preserve your own opinion, but rather learning how to discover the truth, recognizing how to see things from different viewpoints and allowing your own perception to change. However, students are still quite limited in “putting effort into or attempting to state their own perspective and point of view” (M=3.41). Students need to be aware that composure and desire to learn are necessary, but they also need to make efforts to state their own perspective when participating in debates, boldly express their own views and avoid being too agreeable.

#### 4. CONCLUSION AND PROPOSALS

Critical thinking skill is one of the skills of most interest in all countries around the world, including Vietnam. From the practical survey, 16% of students have poor critical thinking skills, 65% are average, 17% are good, and only 2% are excellent. The results show that critical thinking skills of Da Nang high school students are average. The demonstration levels of the components of these skills are relatively uniform. Students’ awareness of critical thinking skills is at an average level; out of 6 component skills, they are best at self-regulation, the worst is inferencing skills; students have good emotions and attitudes while debating. Factors such as gender and academic ratings have a certain influence on students’ critical thinking skills.

In order to improve critical thinking skills, students need to be aware of this skill, understand the concept correctly, and demonstrate them in addition to improving other component skills such as interpretation skills and inferencing skills. It can be seen that raising awareness and promoting to students the knowledge related to critical thinking skills that they need to know will be a theoretical method that contributes to improving these skills. Regarding ways to improve critical thinking skills, most students want their families to respect their own opinions and facilitate them to express their personal views on family issues, to be respected by their peers, to be able to learn in an open atmosphere, and to organize debates on issues with different points of view. As for themselves, students find that their interest and motivation in social learning and understanding have a great influence on their critical thinking skills, so they want to be inspired to learn from their learning environment and able to participate in experiential programs to improve these skills. Other measures such as forms of technology

(such as learning on Quiziz and Wordwall apps), exercises for developing critical thinking skills from simple to complex levels should also be promoted in a friendly and interesting way to create interest and excitement for students when learning about these skills so that they can be effectively improved.

#### REFERENCES

##### Vietnamese References

1. Nguyen Thi Anh Dao (2017). *Developing critical thinking capacity for students in teaching Vietnamese short stories in the period after 1975, Grade 12 Literature program.*
2. Nguyen Thi Giang, Pham Xuan Quang, Duong Hong Tham (2017). *The reality of critical thinking skills in learning activities of the 8<sup>th</sup> year of the Institute, Faculty of Education, Institute of Educational Management.* Education Management Magazine No. 9/2017, 89 - 94.
3. Phan Thi Thanh Hoi, Le Thanh Oai (2020). *Training students’ critical thinking skills in teaching high school students.* The 4th National Science Conference. Scientific report on Biology Research and Teaching in Vietnam, 1020.
4. Phan Thi Luyen (2008). *Training the critical thinking of high school students through teaching the topic of equations and disequations.*
5. Richard Paul – Linda Elder (2015). *The miniature guide to critical thinking. Concepts and Tools.* Ho Chi Minh City General Publishing House.
6. MSc.Nguyen Thi Nga (2018). *Developing critical thinking for students in the smart school model.* Hanoi National University of Education. Proceedings of the International Conference on Education: Education for All, 34-42.
7. Bui Loan Thuy, Pham Dinh Nghiem (2010). *Lesson plan - Soft skills.*
8. Dang Thi Da Thuy, Nguyen Thi Dieu Phuong, Truong Luong Nhat Ha (2021). *Designing questions to train students’ critical thinking in teaching the topic “Reproduction in plants” in body biology, Grade 11 Biology.*

##### Foreign References

1. Brookfield, S.D. (2000). *“Contesting criticality: Epistemological and practical contradictions in critical reflection” in Proceedings of the 41st Annual Adult Education Research Conference.*
2. Browne, M.N., Kubasek, N.K., Harris, J.A. (1989). *The challenge to critical thinking posed by gender-related and learning styles research.* To Improve the Academy, 225-234
3. Cano, J., & Martinez, C. (1991). *The relationship between cognitive performance and critical thinking abilities among selected agricultural education*

- students. *Journal of Agricultural Education*, 32(1), 24-29.
4. Dewey, J (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. New York: DC Health and Company.
  5. Diane F. Halpern (2003). *The Halpern Critical Thinking Assessment (HCTA)*.
  6. Edward M. Glaser (1941). *An experiment in the development of critical thinking*. New York, Bureau of Publications, Teachers College, Columbia University.
  7. Elham Zandvakili (2019). *Department of teacher education & curriculum studies, college of education, teaching patterns of critical thinking: The 3CA model – concept maps, critical thinking, collaboration, and assessment*. University of Massachusetts Amherst, MA, 01002, USA.
  8. Facione, P.A (2015). *Critical thinking: What it is and why it counts*, APA Report.
  9. Facione P.A & N.C. Facione (1992). *California Critical Thinking Disposition Inventory*.
  10. Gorzycki, Meg, Linda Elder, and Richard Paul (2013). *Historical thinking: Bringing critical thinking explicitly into the heart of historical study*. Tomales, CA: Foundation for Critical Thinking Press.
  11. *How to write a paragraph: The art of substantive writing*. Foundation for Critical Thinking, (2011).
  12. Hunter, David A. (2009) *A practical guide to critical thinking: Deciding what to do and believe*.
  13. Mauk, John, Jayme Stayer, and Karen Mauk (2014). *Think about it: Critical skills for academic writing*. Wadsworth Cengage Learning.
  14. Marzieh Dehghani, Hossein Jafari sani, Hamideh Pakmehr, Asma Malekzadeh (2011). *Relationship between students' critical thinking and self-efficacy beliefs in Ferdowsi University of Mashhad, Iran*.
  15. Malahayati, E. N. (2014). *The correlation between metacognitive skills and critical thinking skills with the biology learning outcomes of students who undergo problem based learning in class XI high school students in Malang*. State University of Malang, Malang, Indonesia.
  16. *National Council for Excellence in Critical Thinking* (1987).
  17. Natcha Mahapoonyanont (2012). *The causal model of some factors affecting critical thinking abilities*.
  18. Nahid Salahshoor, Marzieh Rafiee (2016). *The relationship between critical thinking and gender: a case of Iranian EFL learners*.
  19. Richard Paul and Linda Elder (2007). *A guide for educators to critical thinking competency standards: standards, principles, performance indicators, and outcomes with a critical thinking master rubric*. Foundation for Critical Thinking.
  20. Robert H. Ennis (1993). *Critical thinking assessment, theory in to practice*.
  21. Robert H. Ennis, Emeritus Professor, University of Illinois (2011). *The nature of critical thinking: An outline of critical thinking dispositions and abilities*.
  22. Robert H. Ennis (2002). *Goals for a critical thinking curriculum and its assessment*.
  23. Robert H. Ennis (2011). *Critical thinking: Reflection and perspective*.
  24. Simon Bradley & Nicole Price (2016). *Critical thinking: Proven strategies to improve decision making skills, increase intuition and think smarter!*
  25. Surachman, Y. (2010). *The correlation between concept understanding and critical thinking skills in the implementation of problem based learning in biology learning in class x in Malang*, Magister Thesis., State University of Malang, Indonesia.
  26. Zhou, Jiang & Yao (2015). *The investigation on critical thinking ability in EFL reading class*.