Psychological Factors and Critical Thinking Attitudes of Students in Earth Science Exposed to Computer Assisted Instruction (CAI)

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Abstract

This study aimed to determine the psychological factors of students in Earth Science exposed to computer-assisted instruction and assess whether these factors have a significant relationship with the critical thinking attitude of students. The study uses a descriptive-correlational design to evaluate the relationship between two variables. The study utilized content-validated questionnaires to assess both variables, which were administered to 88 second-year BSEd Sciences students at Central Mindanao University. The findings of the study revealed that psychological factors showed a highly significant relationship with students' critical thinking attitude. The study recommends that teachers may infer the highly significant relationship between students' psychological factors and their critical thinking attitude. This may serve as a basis for improving their students' critical thinking by fostering a positive psychological attitude, which is crucial for making scientific judgments.

Keywords

critical thinking attitude, computer-assisted instruction, motivation, psychological factors, stress, self-efficacy, test-anxiety
INTRODUCTION

Background of the Study

Through the years, many issues have rocked our educational system, which continue today without ceasing. One notable problem is the deteriorating quality of education. Research and case commissions have revealed that the reason for the declining standard of education is inadequate lab and library facilities, poor instructor quality, scarce government support for education, poor learning environments, curriculum content, insufficient textbooks and science equipment, ineffective teaching strategies, insufficient classroom space, and others. According to the Program for International Student Assessment (PISA) scores from 2018, the Philippines performed poorly in both mathematics and science and was ranked second-lowest in reading. Below the average of partner countries, the Philippines achieved 340 points in reading, 353 points in mathematics literacy, and 357 points in science. These scores put them below the average of partner countries, which was 467 points.

Seemingly, psychological aspects are those elements that significantly affect students’ capacity for knowledge acquisition, skill acquisition, perception of educational material, attitude toward others, and mutual understanding with those around them. Additionally, critical thinking is the most crucial component of learning since it aids pupils in considering and understanding their viewpoints. This skill enables a student to comprehend the world through their experiences and observations. This study specifically aimed to determine the psychological factors and critical thinking attitudes of students in Earth Science exposed to computer-assisted instruction and whether psychological factors have a correlation with students’ critical thinking attitudes.

Literature Review

Psychological Factors

Psychology is one of the numerous things that influence people's daily activities. Success and failure that we experience in the different daily activities we engage in are influenced a lot of the time by our daily psychology. Thus, individuals can suffer from a variety of psychological issues that, at times, substantially hinder their capacity to carry on with their daily life. Psychological elements like self-efficacy, stress, anxiety, and lack of motivation are the primary reasons for these problems. Apparently, Beharui & Teshome (2018) found a strong relationship between student self-efficacy and internal motivation when researching the impact of psychological elements. The impact of several factors (including self-efficacy, motivation, anxiety during exams, and stress) on students’ success in higher institutions of learning. Evidently, students’ pursuit of higher education is a pretty complicated process that is caused by various types of variables, including psychological ones. The importance of psychological components can be demonstrated in how successfully pupils are able to study, acquire skills, interpret educational content, behave toward others, and interact with people around them (Dvornikova, 2016).

In addition, psychological factors should be mentioned because they affect students’ motivation and encouragement to study, which is a key factor in improving academic performance among tertiary students (Tokan & Imaikalata, 2019; Motevalli et al., 2013). This leads to a perspective that claims there is a close connection between many psychological factors that affect motivation and students’ motivation to engage in their academic and professional activities (Kortukova et al., 2020). Subsequently, numerous scientists are actively presenting the theoretical underpinnings of the impact of psychological elements on students' motivation to study at tertiary educational institutions in their works. Specifically, Siljeyjsr & Mokljuk (2014) said that the motivation of students to pursue higher education is viewed as a significant psychological and educational issue. Scientists have determined, based on the findings of the investigations, that teachers' well-chosen training approaches and strategies have a favorable impact on students' acquisition of educational information. The arrangement of students' study activities, namely the selection of learning methods and approaches, is also significant in this context (Myronets et al., 2020).

Additionally, it should be understood that psychological elements do not always contribute to the process of raising pupils' motivation. Thus, the finest pedagogical experience reveals a lot of instances when psychological factors like addiction, failure anxiety, and depression—are important factors that contribute to students’ failure to complete their studies at tertiary institutions (Amiri & Ghosnolol, 2015). However, research demonstrates that psychological factors have a significantly greater beneficial impact on a student's motivation to study than a negative impact (Skydan, 2011).

Critical Thinking Attitudes

Critical thinking abilities are a crucial component of contemporary education (Mouhtarim, 2018), crucial skills for students’ success in class (Verawati et al., 2019); and the most crucial practical abilities (Mutakinti & Anwari, 2018). It is crucial for students to have problem-solving skills (Handoyo et al., 2019; Ozgenel, 2018) and a method for making wise decisions (Ozgenel, 2018) so that our actions are compatible with what we perceive to be true. According to Duran and Đökme (2016), critical thinking enables students to identify the reason why a variable changes as well as how one variable affects other factors. Practical, introspective, reasonable, beliefs, and behaviors are crucial components of critical thinking (Handoyo et al., 2019; Mutakinti & Anwari, 2018).

Additionally, mastering critical thinking techniques might improve one's capacity for valid reasoning and defensible decision-making (Dwyer et al., 2014; Nasr, 2021). Evaluating the varying definition of critical thinking attitudes, Lu (2019) asserts that critical thinking attitude is essential to function efficiently and productively in evaluating information as well as solving complicated problems. It is the manner in which a person critically evaluates the result of his cognitive processes and searches for inclined solutions for overarching problems (Lamm & Teig, 2015). According to Gray (2013), a person possessing a critical thinking attitude is wanting to believe what is true, as well as is interested in examining beliefs that are adequately supported by information currently at hand. This means that a person varies in terms of their critical thinking attitude.
Accordingly, the study of Akar & Kara (2020) proves that critical thinking attitudes vary from person to person since people live in diverse populations with varying perspectives of understanding knowledge. Evidently, critical thinking is essential to learning and is a central outcome in higher education (Lederer, 2007). In fact, critical thinking is crucial in college to fulfill assessment requirements because at the college level it needs a higher order of thinking skills (Elander et al., 2006; Bok, 2006; Paul, 1993).

**Computer-Assisted Instruction (CAI)**

Adding the link between psychological factors into students’ achievement is the use of a proper teaching style. Modern science ideas of teaching and learning heavily rely on computer-assisted instruction (CAI). Over the past few decades, a lot of science educators and researchers have employed CAI to improve science instruction. In the study of Soliman & Hilal (2016), they investigated the effectiveness of Computer-Assisted Instruction on students’ attitudes and achievements and indicated that the application of computer-assisted instruction comparatively to the traditional method of teaching is statistically much higher and significant. Relatively, Mwei et al., (2012) signified that CAI stimulates a positive outlook toward the subject and instructions. Students’ achievement in sciences is highly influenced by varying factors and elements, including instructional methods, in addition to their self-perceived motivation and impact (Hailikari, 2022; Abdellatif et al., 2021). Computer-assisted instruction was found to significantly affect students’ achievement in a variety of courses (Abidoye & Omotunde, 2015; Ayotola & Abiodun, 2010; Gambari et al.,2014; and Salisu 2015). According to research by Abdurrazaq et al. (2017), students who had access to a computer-aided instructional package performed much better academically than those who did not.

**Theoretical and Conceptual Framework**

The conceptual framework for this study is relatively supported by the preceding educational learning theory constructivism in this digital world. This study is certainly dependent on the idea that learning is a dynamic process of understanding knowledge. Hence, learning takes place in different facets in education. In the realm of education, various educational approaches were established to support the teaching-learning process. Besides, there are different learning theories that best describe the procedure and conditions for how students’ learning could possibly be rooted.

However, this study was based on the integration of the two theories effectively used in education, connectivism and constructivism. Connectivism, which according to Siemens (2004), technologies have a great impact on the learning process of students and that our connectedness in the digital world would provide us opportunities to make choices for our learning. Other connectivists assert that knowledge and learning are relatively connected to each other such that knowledge is a network and learning is a process of probing this network. According to Downes (2005), each person’s perception of knowledge varies, and it changes constantly. Knowledge has many facets, it is a way of relating to something and is not a description of something. The fact that a lot of learning can take place online through peer networks is a crucial component of connectivism.

**Figure 1**

Research Paradigm

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
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</thead>
<tbody>
<tr>
<td>Psychological Factors</td>
<td>Critical Thinking Attitude</td>
</tr>
</tbody>
</table>

**Statement of the Problem**

The study clearly aims to understand the psychological factors and critical thinking attitudes of students in Earth Science exposed to computer-assisted instruction and determine whether these students’ psychological factors have a correlation with their critical thinking attitudes. Particularly, this would address the following questions:

1. What is the level of students’ psychological factors towards Earth science exposed to the Computer-Assisted Instruction concerning (a) self-efficacy, (b) motivation, (c) stress, and test anxiety?
2. What is the level of students’ critical thinking attitudes towards Earth science exposed to the Computer-Assisted Instruction in terms of (a) situational attitude and (b) universal attitude?
3. Is there a significant relationship between students’ psychological factors and critical thinking attitudes towards Earth science exposed to Computer-Assisted Instruction (CAI)?

**Methods**

**Research Design**

The study is a non-experimental research and makes use of a descriptive-correlational design to evaluate the relationship between two variables: students’ Psychological factors, including self-efficacy, motivation, and test anxiety, and Critical Thinking Attitudes with two constructs, namely, situational and universal attitudes of students in Earth science.
Sample and Sampling Technique
The study involved second-year Bachelor of Secondary Education major in Sciences students of Central Mindanao University with Earth Science subjects exposed to Computer Assisted Instruction (CAI) for the school year 2022-2023. The researchers used the sampling technique of total enumeration to identify the participants for this study. Hence, all eighty-eight (88) second-year BSEd students were chosen as the participants of this study. They were selected by the researchers since they were exposed to Computer Assisted Instruction (CAI) and were taking up the subject of Earth science.

Research Instrument
The researchers used survey questionnaires to collect data necessary to meet the objectives of this study. Hence, the researchers adapted a total of four survey questionnaires. Three survey questionnaires were for Psychological factors and only one for the critical thinking attitude of the students. The reliability of these questionnaires was assessed through a pilot testing with forty (40) Junior Sciences Education students of Central Mindanao University-College of Education. To measure its reliability, its internal consistency reliability (Cronbach alpha) was determined.

Psychological Factors Questionnaire
Self-efficacy Scale
In determining the level of students’ psychological factors towards Earth science in terms of self-efficacy, the researchers adapted the Self-efficacy scale from the study of Usher, E.L & Pajeres, F., (2009) entitled “Sources of Self-efficacy in Science: A Validation Study”. It is a (24)- item scale designed to test the students’ self-perceptions towards the Earth science subject. The questionnaire underwent validation and was assessed with a Cronbach alpha of 0.863. This questionnaire used a 6-point Likert scale and was interpreted as follows (Figure 2).

<table>
<thead>
<tr>
<th>Range</th>
<th>Qualitative Description</th>
<th>Qualitative Interpretation</th>
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<tbody>
<tr>
<td>5.10 - 6.00</td>
<td>Strongly Agree</td>
<td>Very High</td>
</tr>
<tr>
<td>4.51 - 5.00</td>
<td>Agree</td>
<td>High</td>
</tr>
<tr>
<td>3.51 - 4.50</td>
<td>Somewhat Agree</td>
<td>Average</td>
</tr>
<tr>
<td>2.51 - 3.50</td>
<td>Somewhat Disagree</td>
<td>Low</td>
</tr>
<tr>
<td>1.51 - 2.00</td>
<td>Disagree</td>
<td>Very Low</td>
</tr>
<tr>
<td>1.00 - 1.50</td>
<td>Strongly Disagree</td>
<td>None</td>
</tr>
</tbody>
</table>

Motivation Scale
In discerning the level of students’ psychological factors towards Earth science in terms of motivation, the researchers adapted the motivation scale from the study of Liu, E. Z. & Lin, C. H., (2010) entitled “The Survey Study of Science Motivated Strategies for Learning Questionnaire (MMSLQ) for Grade 10-12 Taiwanese students. It is a (26)- item scale designed to test the students’ motivation toward the Earth science subject. The questionnaire underwent validation and was assessed with a Cronbach alpha of 0.921. This questionnaire used a 5-point Likert scale and was interpreted as shown in Figure 3.

<table>
<thead>
<tr>
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<th>Qualitative Interpretation</th>
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<td>4.51-5.0</td>
<td>Strongly Agree</td>
<td>Very High</td>
</tr>
<tr>
<td>3.51-4.5</td>
<td>Agree</td>
<td>High</td>
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<tr>
<td>2.51-3.5</td>
<td>Neutral</td>
<td>Average</td>
</tr>
<tr>
<td>1.51-2.5</td>
<td>Disagree</td>
<td>Low</td>
</tr>
<tr>
<td>1.00-1.5</td>
<td>Strongly Disagree</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

Stress and Test-anxiety
In determining the level of students’ psychological factors towards Earth science in terms of Stress and Test-anxiety, the researchers adapted the Perception of Academic Stress Scale from the study of Bedewy, D. & Gabriel, D. (2015) entitled “Examining perceptions of academic stress and its sources among university students: The Perception of Academic Stress Scale”. It is a (16)- item scale designed to test the students’ stress and test anxiety towards the Earth science subject. The questionnaire underwent validation and was assessed with a Cronbach alpha of 0.820. This questionnaire used a 5-point Likert scale and was interpreted as shown in Figure 3.

Critical Thinking Attitude Questionnaire
In determining the level of students’ critical thinking attitudes toward Earth science in terms of Situational and Universal attitudes, the researchers adapted the Critical Thinking Attitude Instrument (CTAI) from the study of Lu (2019) entitled “Critical Thinking Attitude: An Exploration of a Critical Thinking Construct”. The Critical Thinking Attitude Instrument (CTAI) has two constructs, specifically situational attitude and universal attitude. It comprises 12 items of situational attitude and 6 items of universal attitude designed to measure the student's level of critical thinking attitude towards the Earth science subject and is measured by the Likert-scale points ranging from 1 to 5. The questionnaire underwent validation and was assessed with a Cronbach alpha of 0.829. This questionnaire used a 5-point Likert scale and was interpreted as shown in Figure 3.

Data Gathering Procedure
All data from the respondents were gathered through research questionnaires adapted from the study of Usher, E.L & Pajeres, F., (2009), Liu, E. Z. & Lin, C. H., (2010), Bedewy, D. & Gabriel, D. (2015), and Lu (2019). The researchers adapted and utilized a total of four (4) content-validated survey questionnaires to obtain the objectives of the study.
Three survey questionnaires were for Psychological factors and only one for the critical thinking attitude of the students. The reliability of these questionnaires was assessed through carrying out a pilot testing with forty (40) Junior Sciences Education students of Central Mindanao University-College of Education. To measure its reliability, its internal consistency reliability (Cronbach alpha) was also determined. Following research ethics, the researchers followed ethical considerations upon the employment of data-gathering procedures. The researchers initially asked permission and approval of the dean of the College of Education through Prof. Ehrich Ray H. Magday, Science Education Department chairperson. Furthermore, the researchers additionally submitted an application for an IERC permit. A letter of consent was also disseminated to the participants after being approved to conduct the study. Since all data in this study were gathered through tangible survey questionnaires, to keep the confidentiality of the data, participants’ identity remained anonymous.

Data Analysis

Data underwent descriptive statistics analysis by determining the mean, to interpret the students’ level of psychological factors; self-efficacy, motivation, and stress & test anxiety and critical thinking skills; situational attitude and universal attitude. The independent variables which are psychological factors and the dependent variable which is the students’ critical thinking problem skills will be statistically tested with IBM SPSS to compute correlation coefficients and their respective probability values. Pearson correlation coefficient (r) statistical analysis was utilized to determine the strength of the correlation between students’ psychological factors and critical thinking attitudes. The standardized correlation coefficient classification which classified correlation coefficients into specific ranges with assigned description developed by Hoshmand (1997) was utilized to describe the degree of correlation between two variables, which is interpreted as follows.

Ethical Considerations

The researchers are aware of the ethical considerations upon conducting the research study. The researchers asked for a letter of approval from the Dean of Education and Chairman of the BSE Sciences to conduct the study with a note from the researcher’s advisor. The researchers also obtained consent from participants, attached to it were the participants’ signatures as proof of their willingness to participate in the study. The consent form includes a thorough explanation of the research study and the methods, and how their responses will be used. Also, indicating the freedom of the participants to withdraw freely from the study anytime. Any data gathered from the participants remains confidential and stored securely, it is only used for the interested purpose, only held for as long as necessary, and destroyed once no longer needed. The researchers ensured that ethical practice is applied and should be carried out in a professional, respectful, and courteous manner.

Results and Discussion

Students’ Psychological Factors

The table in Table 1 shows the summary of students’ level of psychological factors in a computer-assisted instruction learning environment. The table presents the combined mean scores of the three (3) dimensions of psychological factors: Self-Efficacy (3.84); Motivation (3.69); and Stress and Test Anxiety (3.51). The results indicate that the students’ level of psychological factors was “High.” This implies that students’ academic performance towards the subject earth science in computer-assisted instruction learning environments is greatly influenced by these factors. It means that how students perceive things around them could greatly affect their status as students. Hence, the study of Beharu & Teshome (2018) supports the result that self-efficacy, motivation, and stress & test anxiety are important psychological factors that may affect students’ performance in class.

Table 1
Summary of Students’ Psychological Factors

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Mean</th>
<th>Descriptive Rating</th>
<th>Qualitative Description</th>
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</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>3.84</td>
<td>Agree</td>
<td>High</td>
</tr>
<tr>
<td>Motivation</td>
<td>3.69</td>
<td>Agree</td>
<td>High</td>
</tr>
<tr>
<td>Stress and Test-anxiety</td>
<td>3.51</td>
<td>Agree</td>
<td>High</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.68</td>
<td>Agree</td>
<td>High</td>
</tr>
</tbody>
</table>

Students’ Critical Thinking Attitudes

Table 2 shows the summary of students’ level of critical thinking attitudes in a computer-assisted instruction learning environment. The table reveals the combined mean scores of the two critical thinking attitude constructs namely: situational attitude (3.44); and universal attitude (3.54). The results indicate that the students’ level of critical thinking attitude was just Neutral at 3.49 and have a qualitative interpretation of “Average.” This implies that students’ level of critical thinking attitude in a computer-assisted instruction learning environment is just at an average level. The average result of students’ critical thinking skills can be reflected in why it is essential to put forth substantial effort in developing suitable learning methodologies for the ongoing development of learners’ critical thinking abilities and curiosities. In addition, it is necessary to plan and modify education in order to create a learning environment and its efficacy in fostering students’ critical thinking abilities.
Table 2  
Summary of Students’ Critical Thinking Attitudes

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Mean</th>
<th>Descriptive Rating</th>
<th>Qualitative Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal Attitude</td>
<td>3.54</td>
<td>Agree</td>
<td>High</td>
</tr>
<tr>
<td>Situational Attitude</td>
<td>3.44</td>
<td>Neutral</td>
<td>Average</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.49</td>
<td>Agree</td>
<td>High</td>
</tr>
</tbody>
</table>

Correlation Analysis Showing the Significant Relationship Between the Independent and Dependent Variables

Table 3  
Correlation Analysis on Students’ Psychological Factors and Critical Thinking Attitudes in a Computer Assisted Instruction Learning Environment

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Correlation Coefficient (r)</th>
<th>p &lt; f</th>
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<tbody>
<tr>
<td>Psychological Factors</td>
<td>.568**</td>
<td>0.000</td>
</tr>
<tr>
<td>Motivation</td>
<td>.539**</td>
<td>0.000</td>
</tr>
<tr>
<td>Stress and Test-anxiety</td>
<td>.483**</td>
<td>0.000</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>.377**</td>
<td>0.000</td>
</tr>
</tbody>
</table>

The table presents the correlation analysis showing the relationship between psychological factors and critical thinking attitude in a Computer Assisted Instruction Learning Environment. Based on the data presented, the result revealed that Psychological factors which have a correlation coefficient of 0.568 and a p-value of 0.000 and its descriptors; motivation 0.539, stress and anxiety 0.483, and self-efficacy 0.377 found a highly significant relationship on students’ critical thinking attitude. These medium positive correlation coefficients are an indication that students’ critical thinking attitudes are influenced by psychological factors. It manifests how science education students, exposed in a Computer Assisted Instruction learning environment — deal with critical thinking in the earth science subject is greatly affected by one’s personality towards learning, which is represented by particular psychological factors.

These positive linear relationships, therefore, indicate that the null hypothesis, which states that there is no correlation between psychological factors and critical thinking attitudes of students in Earth Science exposed to Computer Assisted Instruction (CAI), is rejected. Since it is evident from the given data above that the two variables significantly correlate with each other. Evidently, psychological flexibility can positively influence better cognition. Thus, the entire level of perceived cognitive load could be predicted more accurately by external psychological constraints.

CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

Conclusion and Implications

Based on the findings of the study, the level of students’ psychological factors towards Earth science exposed to Computer Assisted Instruction was “High”. Evidently, all students’ psychological factors in terms of self-efficacy, motivation, and stress and anxiety recorded a result of “High”. These findings reveal that the students’ confidence in their capabilities in earth science was satisfactory, and they have a positive attitude towards learning earth science. They are motivated to succeed and are prepared to put in the necessary time and effort to do so in the subject of earth science while also experiencing academic stress and test anxiety.

On the level of students’ critical thinking attitude towards the subject, a “High” level was observed in the universal attitude construct. However, the “Average” level of critical thinking attitude was observed in the situational dimension of science education students. Clearly, the students’ level of critical thinking attitude exposed to computer-assisted instruction is “Average”. These findings imply that students are extremely skilled in assessing their critical thinking attitude regarding the absence of specification or situational characteristics. They are thinking rationally and making their learning in an authentic and credible manner.

Evidently, the second-year science students’ psychological factors, considering three dimensions namely: self-efficacy, motivation, and stress and test anxiety, have a highly significant relationship on students’ critical thinking attitude with two constructs, the universal and situational attitude exposed to computer-assisted instruction. This manifests how science education students exposed in a Computer Assisted Instruction learning environment deal with critical thinking in the earth science subject, is greatly affected by one’s personality towards learning which is represented by particular psychological factors.
Recommendations

For further research and actions, teachers may refer to the findings of this study to realize the importance of psychological factors towards students’ perception and attitude towards their subject. Specifically, on how to help students build their self-efficacy through social modeling which emphasizes the importance of observing the behaviors and attitudes of others in order to learn. In addition, teachers must also help in building students’ intrinsic and extrinsic motivation, as motivation can dramatically help students’ determination to learn and perform well in their studies. Moreover, students are likely to experience academic stress and test anxiety with too difficult exams, short time allocation, and critical expectations given to them, thus it is suggested to teachers that they may conduct item analysis on their exams to ensure that their questions may not be too difficult, ensure a considerable length of time during exams, and avoid putting too much pressure on students.

Teachers, as the facilitator of teaching and learning in the classroom, are encouraged to utilize a teaching method which promotes students’ creativity and critical thinking skills. By utilizing this, you may help students improve and practice their critical thinking attitude which is vital towards learning science. Teachers may also infer the highly significant relationship on students’ psychological factors towards their critical thinking attitude. As this may become their basis for improving their students’ critical thinking through fostering a positive psychological attitude of their students. To future researchers, it is recommended that if you want to further conduct the same research problem you may increase the sample size in a different setting, context, location, or culture. You may also opt to study other subjects aside from science and other teaching styles apart from computer-assisted instruction in order to see if there are new results. In addition, statistical analysis may be added with multiple regression analysis in order to determine which independent variables are known to predict the value of the single dependent variable.

References


Author(s)' Statements on Ethics and Conflict of Interest

Ethics Statement: The author(s) hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. The author(s) take full responsibility for the content of the paper in case of dispute.

Originality and Plagiarism Assessment: The manuscript has a similarity assessment of less than 20% in accordance with the publication ethics in terms of originality and plagiarism and the plagiarism policy of the journal.

Statement of Interest: The author(s) have no conflict of interest to declare.

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Suggested Citation


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