Article

How 15 Dimensions of Consciousness Quotient Associate with the Critical Thinking of University Students

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Abstract

Background and aim: In today's highly competitive world, individuals exhibit a great curiosity to explore novel concepts, engage in new endeavors, and approach their challenges in innovative ways. To navigate students' educational journeys and prepare for the challenges of the modern world, human consciousness offers major opportunities to accelerate thinking. This study aimed to investigate the relationship between consciousness quotient and critical thinking, and how components of consciousness contribute to the prediction of critical thinking

Method: This study was cross-sectional correlation research. Consciousness quotient was measured using the Consciousness Quotient Inventory (2020) and critical thinking was assessed using the Critical Thinking Murthy Scale (2017). Pearson's Correlation and Multiple regression analysis were applied.203 university students were enrolled in the study (N =143, 90 females, M age = 19.34). The participants completed 268 items of (CQ-i) and 20 items of (MCTS). The responses on these two scales were taken in 6 sessions of one hour each.

Results: The result showed that the total mean score for consciousness quotient was 88.36 (19.04) and the mean score for critical thinking was 39.16 (8.81). Data analysis showed a positive correlation between university students' consciousness quotient and critical thinking (Pearson's r = 0.321, p<0.01). A multiple linear regression analysis was performed using critical thinking as a dependent variable and consciousness quotient and the dimensions of consciousness quotient as independent variables. Of these 15 variables, no variables were identified as significant predictors of critical thinking. The coefficient of determination R square of the regression model showed that input variables can explain 17% of the total score of critical thinking. These findings provide a preliminary account of how human critical thinking associates with the consciousness quotient of university students. Results indicated that there exists a significant relationship between the consciousness quotient and critical thinking of university students. The study also shows that consciousness quotient has a significant role in predicting critical thinking.

Keywords: Consciousness quotient, critical thinking, dimension, university student, correlation.

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1. Introduction

The scientific evaluation of consciousness has been debated over the past few decades. Consciousness has become a significant topic of interdisciplinary research in cognitive science, with significant contributions from fields such as psychology, neuropsychology, and neuroscience (Tart, 1975, Baars; 1986, 1999, Wolman and Ullman, 1986, Damasio, 1989, Natsoulas, 1992, Penrose, 1994, Crick and Koach, 1995, Chalmers, 1996, Cohen and Schooler, 1997, Hameroff et al., 1998, Varela and Sher, 1999, Metzinger, 2002). Consciousness is mysterious and subjective in nature.

Recent studies in the field of consciousness suggest that consciousness quotient can help in better understanding of feelings, and emotions of oneself and others and thus improve the rate of development and quality of life (Brazdau et al., 2021). The consciousness quotient assesses the frequency of conscious experience that includes psychological constructs (Brazdau, 2009). It is a state of being aware and less autopilot in doing daily routines like (ready for school, driving the car, etc.) thinking, interacting with people and the environment, feeling and experiencing something around, and being more conscious or having a higher degree of choice in commencing a behavior are all characteristics of having a higher consciousness quotient (Brazdau, 2021).

It also means a better capacity for connecting with life and experiencing fresh aliveness through the body (Brazdau and Ahuja, 2016). An essential element of the conscious experience is intentionality which allows a person to choose deliberately what behavior to enact and what attitude to allow and select (Brazdau, 2021). The CQ-i assesses various patterns of behavior, attitudes, and styles of attention, along with the utilization of conscious skills, awareness, and the ability to feel awake and alive (Brazdau et al., 2021).

Similarly, the conceptualization of critical thinking has also evolved over the years (Park et al., 2021). Thinking is the highest mental ability of human beings which basically differentiates them from animals. It includes the component skills of analyzing arguments and making inferences using inductive and deductive reasoning which is a major component of critical thinking. It is related to mental skills and cognition which play a vital role in growth and development and are needed to carry out any task from the simplest to the most complex. These have more to do with the mechanisms of how we learn, remember, solve problems, and pay attention, rather than with any factual knowledge. The search on the term "Critical Thinking," revealed that there are suggested meanings within the realms of philosophy and psychology.

However, in a broader context, this term does not possess a definite or specific definition (Iyer, 2019). Critical thinking is the purposeful, self-calibrated judgment; this kind of judgment manifests itself in interpretation, analysis, evaluation, inference, and the explanation of the evidence, concept, method, standard, or context on which the judgment depends (Nair and

Lynnette Lesseberg, 2013). Although there is no consistent definition, it is commonly understood as a purposeful and self-regulatory cognitive process that encompasses interpretation, analysis, evaluation, inference, and explanation, considering various factors such as evidence, concepts, methodologies, criteria, and contexts (Facione, 1990). The skills aspect mainly refers to higher-order cognitive skills such as inference, analysis, and evaluation (Dwyer, 2017).

2. Relationship Between Consciousness Quotient and Critical Thinking

Most of the studies thus far referenced have investigated consciousness quotient and critical thinking separately.The state of consciousness (or level of being conscious) that we experience in the morning, between one and two hours after we awaken from a restful sleep, without being subjected to any substantial stimuli, such as coffee, television, radio, music, or conversation (Brazdau,2009). Conscious experiences are basically the states of awareness, awake, knowing something about oneself, and being aware of the outside world (Brazdau,2008).

There is evidence from several research that mindfulness, yoga, meditation, and physical activity have a significant relation with consciousness quotient (Brazdau, 2008; Gorbani and Cunningham, 2010; Ahuja, 2014; Chaturvedi, 2015, Pradhan, 2015). The studies have found that conscious experiences also affect one's task performance, academic achievements, and cognitive abilities (Aggarwal, 2013; Brazdau, and Mihai, 2011; Chaturvedi, 2015; Sharma, Ahuja, and Satsangi, 2016). Consciousness quotient has a significant effect on self-concept, executive functioning, mind wandering, emotional intelligence, and brain functioning (Kunishi, Smallwood, 2016; Lane, 2017; Sharma, 2016; Aggarwal, 2016).

A growing body of research suggests that critical thinking plays a crucial role in university students' activities, including academic performance and their ability to handle life events (Ghanizadeh, 2017, Ren et al, 2020). Numerous studies have found that critical thinking predicts cognitive abilities, decision-making, metacognitive skills, self-regulation, self-efficacy, mathematical thinking, and personality traits (Whitten, Brahmasrene, 2011; Butler, Bong and Pentona, 2017; Orluwene, Okoye, 2020; Celik, Furkem, Ozdemir 2020).

Previous research examining the link between divergent thinking and critical thinking has found a moderate correlation (r=0.23, p<0.05) between these two constructs. (Gibson et al., 1968). Using components of consciousness quotient also finds a moderate correlation between consciousness quotient and academic performance (r=.209, p<.05) (Brazdau and Mihai,2011). Consciousness quotient and critical thinking both contribute to cognitive development but in different ways throughout the primary to university level.

The above research provides preliminary evidence of the relationship between consciousness quotient and critical thinking in different aspects with different variables. The current study aimed to answer a few questions related to this line of thought. What is the relationship between

the consciousness quotient and critical thinking of university students? How does the consciousness quotient influence the critical thinking of university students? How do components of the consciousness quotient influence the critical thinking of university students? Firstly, we hypothesized that there is a positive correlation between all the variables. More specifically, this study examined whether the consciousness quotient and the components of the consciousness quotient are predictors of critical thinking.

3. Method

Participants and Procedure

A total of 203 university students (N = 143, 90 females, M age = 19.34) participated in this descriptive correlational study. The participants completed Consciousness Quotient Inventory (CQ-i) and Murthy Critical Thinking Scale (MCTS). The responses to these two measures were taken in 6 sessions of one hour each. The inclusion criteria consisted of undergraduate and graduate university students, willingness to complete 268 items of CQ-i, and 20 items of MCTS in at least 6 sessions. In this study, the effective recovery rate of the questionnaire was 70.44% (143/203). The elimination of 60 responses was based on the result of the CQ-i lie detector.

Measures

Consciousness Quotient Inventory (CQ-i)

The consciousness quotient inventory beta version was first released in 2008 and then, a series of studies refined the concept and the measurement procedures (2008-2020). The standardized version of CQ-i v. 2020 evaluates the frequency of various behaviors, attitudes, and attentional styles, as well as the usage of conscious skills, awareness, and the capacity to 'feel awake and alive,' providing a complex exploration of conscious experience (Brazdau et al., 2021). The responses are taken on a six-point Likert scale (yes/no) and include a lie filter and reversed items to check the fake responses. The 15 components of theConsciousness Quotient Inventory are perspective taking, clarity of discrimination, quality of experience, spirituality, global self, physical self, language self, energy self, cognition self, social-relational self, inner growth, non-conceptual self, multi-modal integration, and habitual pattern.

Murthy Critical Thinking Scale (MCTS)

Murthy's Critical Thinking Scalewas first released in 2015. The dimensions of MCTS (Murthy Critical Thinking Scale) are analytic and synthetic abilities, objectivity, anticipation of consequences, intelligence, and logical thinking. This is a scale where four conflicting situations are given. A respondent has to imagine that he is in that situation. For each situation, she/he has toanalyze the situation and write different merits and demerits. The respondent is also expected

to write how she/he would conclude her/his opinion for every situation. She/he should also give reasons. Reliability (Cronbach's alpha= 0.752).

Table 1. Dimensions of Critical Thinking

Factor	Content
Analytical and Synthetic Abilities	The ability to analyze different components of a social and personal situation.
Objectivity	The ability to analyze social and personal situations based on pros and cons dispassionately by delinking personal feelings and subjectivity.
Anticipation of Consequences	The ability to anticipate the consequences of any line of thinking in social and personal situations.
Intelligence	The general ability to weigh the strengths and weaknesses of any situation in the process of its understanding.
Logical Thinking	The ability to think and reason systematically on all social and personal situations of life based on objective principles.

Note. Adapted from Example Book, by C.G. Venkatesh Murthy, 2015.

4. Results

The overall response rate in this study was 70.44%. The mean age of participants was 19.21 (SD: 2.27). The distribution of the mean score of consciousness quotient was 88.36 (SD: 19.04) (range: 9.27-132.59), and 39.16 (SD: 8.81) (range: 10-52) for critical thinking. Other demographic characteristics are shown in Table 2.

Table 2. Descriptive statistics of the study variables (N= 143).

Variable	Mean	SD	Min	Max
Total CQ	88.36	19.04	9.27	132.59
Total CT	39.16	8.81	10	52
Perspective taking	83.99	19.51	7.37	129.25
Clarity of discrimination	87.20	19.20	10.41	130
Quality of experience	95.48	16.20	29.09	131.36
Spirituality	92.76	16.21	25.51	128.44
Globalself identity	90.82	17.89	16	132.57
Language use	83.12	19.70	3.33	128.88
Physical self	91.71	17.83	25.55	128.33
Energy self	96.96	16.61	32	134.5
Cognition self	85.86	20.30	7.90	129.65
Non-conceptual self	98.13	14.76	37.11	131.73
Social relational	85.12	19.45	5.44	130.80
Inner growth	88.29	18.14	17.77	130.83
Multi-modal integration	90.29	17.36	24.53	126.25
Habitual pattern	89.58	17.70	21	128
Awakening skills	92.45	18.31	18.18	133.40

Correlation Between Consciousness Quotient And Critical Thinking

Data analysis showed a significant positive correlation between the consciousness quotient and critical thinking of university students (r = 0.321, p <0.01). The components of consciousness quotient were significantly correlated with critical thinking. Of these 15 components, quality of experience has the highest correlation (r=0.34, p<0.01) and language use has the lowest correlation (r=0.28, p<0.01). The rest of the results for correlation between the variables are presented in Table 3.

Table 3. Correlations between variables

VAR.	CT	P.T	C.D	Q.E	SPL	G.S	L.U	P.S	E.S	C.S	N.C	S.R	I.G	M.M.I	H.P	A.S	C.Q
1	1	0.29	0.32	0.34	0.33	0.32	0.27	0.33	0.33	0.29	0.33	0.29	0.3	0.33	0.31	0.34	0.32
2	0.29	1															
3	0.32		1														
4	0.34			1													
5	0.33				1												
6	0.32					1											
7	0.27						1										
8	0.33							1									
9	0.33								1								
10	0.29									1							
11	0.33										1						
12	0.29											1					
13	0.3												1				
14	0.33													1			
15	0.31														1		
16	0.34															1	
17	0.32																1

1. Critical Thinking(CT); 2. Perspective Taking(PT); 3. Clarity of Discrimination(CD); 4. Quality of Experience (QE); 5.Spirituality(SPI); 6.Global Self (GS); 7. Language Use (LU); 8. Physical Self (PS); 9. Energy Self (ES); 10. Cognition Self (CS); 11. Non Conceptual Self(NCS); 12. Social Relational (SR); 13. Inner Growth (IG); 14.Multi-Modal Integration(MMI); 15. Habitual Pattern(HP); 16. Awakening Skills(AS); 17. Consciousness Quotient(CQ). ***p<0.01*.

Regression Analysis

Table 4 indicatesthe results of multiple regression analysis regarding the predictor of critical thinking. A multiple linear regression analysis was performed using critical thinking as a dependent variable and consciousness quotient and the components of consciousness quotient as independent variables. Of these 15 components, no components were identified as significant predictors of critical thinking. The coefficient of determination (R^2) of the regression model showed that input variables can explain 17% of the total score of critical thinking. The components reported in Table 4, are perspective-taking, clarity of discrimination, quality of experience, spiritual harmony, global self-identity, cognition self, physical self, non - conceptual self, social-relational interconnectivity, inner growth, habitual pattern, awakening skills, and multi-modal integration were not the predictors affecting critical thinking.

5. Discussion

The current study aimed to investigate the relationship between consciousness quotient and critical thinking and, to study the contributory role of consciousness quotient components in determining university students' critical thinking. Our results supported the first hypothesis regarding the positive correlation among all of the variables. The correlation between the consciousness quotient and critical thinking wasfound to be positive (r= 0.321, p<0.01). This result was in line with the previous research that suggests that critical thinking is a cognitive process that is facilitated by consciousness (Rivas., Saiz, & Ossa, 2022, Magno, 2010, Rosenthal, 2000).

When we are consciously aware of our thoughts and experiences, we can regulate it and can also engage in higher-order thinking, question assumptions, and examine the evidence more effectively. Consciousness allows us to reflect on our own cognitive processes and biases, which in turn enhances our capacity for critical thinking (Rivas., Saiz, & Ossa,2022). Critical thinking involves skills such as reasoning, analysis, evaluation, and problem-solving. Consciousness provides the foundation for engaging in these cognitive processes. By being aware of our own thought processes and biases, we can better monitor our thinking, identify logical fallacies or cognitive biases, and engage in more objective and rational analysis.

Furthermore, consciousness plays a role in metacognition,(Rosenthal,2000) which refers to the ability to think about one's own thinking. Metacognition is closely related to critical thinking,(Magno, 2010) as it involves monitoring and regulating one's cognitive processes. By being conscious of our thinking, we can engage in metacognitive strategies such as self-reflection, self-questioning, and self-evaluation, which enhance our critical thinking abilities. By engaging in critical thinking, we can challenge and examine our beliefs, assumptions, and worldviews.

This process of critical examination can lead to shifts in consciousness, expanding our awareness and understanding of ourselves and the world around us. Thus, though consciousness quotient and critical thinking are distinct they may be interconnected concepts. Critical thinking is a cognitive process, while consciousness refers to subjective awareness. While consciousness may facilitate critical thinking, critical thinking itself does not solely depend on consciousness. Critical thinking can also occur unconsciously or subconsciously, where cognitive processes operate beneath the level of conscious awareness. In conclusion, while the correlation between consciousness and critical thinking is multifaceted, it is evident that consciousness can enhance critical thinking by providing the awareness, metacognition, and self-reflection necessary for effective analysis and evaluation. Similarly, critical thinking can influence consciousness by challenging beliefs and expanding awareness.

Table 4. Multiple regression analysis of the variables

VARIABLES	*B*	*S.E*	*t*	*P-value*	*Lower 95%*	*Upper 95%*	
Intercept	16.12	8.22	1.96	0.05	-0.15	32.40	
Total CQ Score	0.51	0.87	0.58	0.55	-1.22	2.25	x
Perspective-taking	-0.12	0.27	-0.44	0.65	-0.65	0.41	
Clarity of discrimination	0.17	0.41	0.43	0.66	-0.63	0.99	
Quality of experience	0.16	0.24	0.66	0.507	-0.32	0.65	
Spirituality/harmony	0.17	0.21	0.81	0.41	-0.24	0.59	
Global self-identity	-0.12	0.46	-0.28	0.77	-1.04	0.78	
Language use	-0.094	0.18	-0.51	0.60	-0.45	0.26	
Physical self	-0.13	0.19	-0.70	0.48	-0.52	0.25	
Energy self	0.045	0.25	0.17	0.86	-0.46	0.55	
Cognition self	-0.14	0.26	-0.55	0.57	-0.6	0.37	
Non-conceptual self	-0.053	0.23	-0.22	0.82	-0.5	0.42	
Social-relational interconnectivity	-0.18	0.38	-0.46	0.64	-0.94	0.58	
1nner growth	-0.48	0.36	-1.33	0.18	-1.20	0.23	
Multimodal integration	0.31	0.26	1.15	0.25	-0.22	0.84	
Habitual patterns	0.090	0.16	0.53	0.59	-0.24	0.42	
Awakening skills	0.089	0.20	0.43	0.66	-0.31	0.49	

R^2, 0.17; Adjusted R^2 Square,0.070, $p<0.05$; Dependent variable: critical thinking.

On the other hand, our current study found that the components of the consciousness quotient were significantly correlated with critical thinking. Of these 15 components, quality of experience has the highest correlation (r=0.34, p<0.01) and language use has the lowest correlation (r=0.28, p<0.01). Quality of experience is a subjective aspect of conscious experience and how qualities like mindfulness, self-compassion, and a deeper connection with the present moment can enhance our sense of well-being and our understanding of life's mysteries (Brazdau,2021). Critical thinking can contribute to the quality of experience by promoting conscious engagement, enhancing perception and understanding, and fostering intellectual curiosity.

By applying critical thinking skills, individuals can deepen their awareness and make the most of their conscious experiences. The results of the study suggest that people who experience qualities like a deeper connection with the present moment may have high critical thinking. Similarly, critical thinking can influence consciousness by challenging beliefs and expanding awareness. Further research and exploration in the field of cognitive science will continue to shed light on the intricate relationship between these two fundamental aspects of human cognition.

The results of this study partially confirmed our second hypothesis and replicated the findings from past studies revealing that cognitive ability is significantly related to consciousness quotient and the contribution of components of consciousness quotient in the prediction of cognitive ability was found statistically significant (Saxena, Ahuja, Brazdau, 2019). A moderate correlation has been found between consciousness quotient and academic performance (r =.209, p<.05) (Brazdau and Mihai,2011). A growing body of research suggests that critical thinking plays a crucial role in university students' activities, including academic performance and their ability to handle life events (Ghanizadeh, 2017, Ren et al, 2020).

Numerous studies have found that critical thinking predicts cognitive abilities, decision-making, metacognitive skills, self-regulation, self-efficacy, mathematical thinking, and personality traits (Whitten, Brahmasrene, 2011; Butler, Bong and Pentona, 2017; Orluwene, Okoye, 2020; Celik, Furkem, Ozdemir 2020). The present study found that the contribution of consciousness quotient in the prediction of critical thinking was statistically significant. The coefficient of determination R^2 of the regression model showed that input variables can explain 17% of the total score of critical thinking. Of these 15 components, no components were identified as significant predictors of critical thinking. Perspective-taking, clarity of discrimination, quality of experience, spiritual harmony, global self-identity, cognition self, physical self, non - conceptual self, social-relational interconnectivity, inner growth, habitual pattern, awakening skills, and multi-modal integration were not the predictors affecting critical thinking.

In addition to the report of our findings, we would like to address some limitations in our study. First, we would like to note that this is a correlational and cross-sectional study. Our results indeed indicate a positive correlation between consciousness quotient and critical thinking. Second, we would like to note the sample involved in this study is considered a limited sample pool, since all the participants are university students enrolled, limiting the generalization of the findings to university students only.

In spite of the limitations mentioned above, the findings of this study have some implications for research and practice intervention. The findings of the study have importance to educational thinkers, teachers, learners, psychologists, and others who are concerned with the sphere of education. A research study can also be done to study the impact of various factors like age, sex, levels of education, and learning styles on the consciousness quotient of students. Future studies are recommended to recruit a more representative sample of university students. Further studies

using longitudinal, controlled designs are needed to assess the effectiveness of consciousness quotient and critical thinking intervention on cognitive skills.

6. Conclusion

The result of our study provides a few insights into the study of consciousness quotient and critical thinking. The findings of this correlational study examining the relationship between consciousness quotient and critical thinking among university students reveal a statistically significant positive correlation coefficient of (r = 0.321, p <0.01). This indicates that there exists a moderate positive relationship between these two constructs. In other words ,as the level of consciousness quotient tends to increase, there is a tendency for critical thinking abilities to also exhibit improvement The study delved into the multi-components of consciousness quotient, encompassing 15 distinct components, and employed multiple regression analysis to explore the predictive potential of these components on critical thinking.

However, the results of the regression analysis indicate that none of the components of consciousness quotient predictor of critical thinking. This suggests that while there is a noteworthy overall correlation between consciousness quotient and critical thinking, the intricacies of consciousness, as measured through its components, do not distinctly account for the variations in critical thinking abilities among the sampled university students. Further research and exploration are warranted to gain a more comprehensive understanding of the complex interplay between consciousness quotient and critical thinking, potentially involving a broader array of variables and encompassing diverse participant demographics.

Compliance with Ethical Standards

Funding: This study is not funded by any external organization. All research activities are conducted independently, ensuring that the findings are not influenced by external financial interests.

Conflict of Interest: There are no conflicts of interest to declare.

Ethical Approval: This article does not contain any studies with animals performed by any of the authors.All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/ or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

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