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Exploring Students' Critical Thinking and Curiosity: A Study on Problem-Based Learning with Character Development and Naturalist Intelligence

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Abstract

This study aimed to investigate the impact of problem-based learning with a focus on character development and naturalist intelligence on critical thinking (CT) abilities and curiosity of students. The study was conducted in a school in the city of Mataram - Indonesia, utilizing a 3x2 treatment by level design. Two groups of students, categorized as having high or low naturalist intelligence, were exposed to three different treatments: problem-based learning with character development (PBL-CD), problem-based learning, and regular learning. Data regarding the students' naturalist intelligence and CT abilities were collected through tests, while information on their curiosity was obtained through observation sheets and self-assessment. Statistical analysis using MANOVA at a significance level of 0.05 was performed. The findings revealed that: (a) PBL-CD had a positive impact on students' CT abilities and curiosity; (b) the naturalist intelligence did not significantly influence students' CT abilities and curiosity; and (c) there was no significant impact observed on students' CT abilities and curiosity when examining the interaction between PBL-CD and naturalist intelligence. Thus, PBL-CD presents itself as a viable strategy to cultivate students' critical thinking skills and inquisitiveness, offering an alternative pathway in routine learning in the classroom.

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INTRODUCTION

The focus of learning extends beyond academic performance and encompasses the holistic development and capacity building of students (Mak, 2014). It is crucial to manage education in a way that cultivates individuals who possess the capacity to actively participate in a society and economy that thrives on knowledge in the modern era of the 21st century (Patel et al., 2017), specifically in the context of industry 4.0 and society 5.0 (Schwab, 2016; Skobelev & Borovik, 2017). Education should equip students with the power of logical reasoning, thinking skills, and ethical values, which are essential for their overall growth (Anazifa & Djukri, 2017). These capacities, work habits, skills, and character traits, are trusted to be vital for achieving success in life (Anazifa & Djukri, 2017). As science and technology rapidly evolve and present formidable challenges (Ritter & Mostert, 2016; Mapeala & Siew, 2015; Rehmat & Bailey, 2014), students must develop CT abilities, cultivate positive character traits, and foster curiosity. These three elements are crucial assets that students must simultaneously develop to navigate the changing world through education.

CT abilities play a crucial role in contemporary education, as highlighted by several researchers (El Mouhtarim, 2018; Walter & Walter, 2018; Hasanpour et al., 2018; Mutakinati & Anwari, 2018). These skills are vital for students to excel academically and in real-life situations (Hasanpour et al., 2018; Mutakinati & Anwari, 2018). By enabling students to solve problems effectively (Handoyo et al., 2019; Özgenel, 2018), CT serves as a valuable tool for making informed decisions (Özgenel, 2018). It allows individuals to discern the truth and take appropriate actions (Handoyo et al., 2019; Mutakinati & Anwari, 2018). Moreover, CT facilitates the identification of cause-and-effect relationships between variables (Duran & Dökme, 2016). This cognitive process encompasses practical, reflective, reasonable beliefs and actions (Handoyo et al., 2019; Mutakinati & Anwari, 2018). In essence, CT entails reflective thinking focused on determining the most valid beliefs and courses of action.

In the realm of science education, students' ability to think critically can be observed through their aptitude in addressing everyday challenges. A critical student demonstrates a proactive approach in problem-solving (Handoyo et al., 2019). They exhibit self-corrective thinking skills (Mutakinati & Anwari, 2018) and possess an enhanced capacity to identify and manage their emotions (Yao et al., 2018). They actively engage in clarifying problems by posing questions, examining issues from various perspectives, gathering pertinent information, expressing their viewpoints, critically evaluating proposed solutions based on rationality, and deriving conclusions from problem-solving endeavors.

Developing curiosity is a crucial component of the learning process. Curiosity refers to a genuine eagerness to explore the unknown, embrace novelty, and embrace uncertainty (Arnone et al., 2011). It is considered a personal trait (Enko et al., 2014), a fundamental aspect of scientific learning (Weible & Zimmerman, 2016), and an essential requirement for individuals engaged in the learning process (Gulten et al., 2011). Students who display high levels of curiosity exhibit several indicators, including a strong desire to seek answers to questions, attentiveness to observed phenomena, enthusiasm for the scientific process, and dedication to each step of the learning activity (Nasution et al., 2018).

Previous research has demonstrated that students' CT abilities are subpar (Khasani et al., 2019). In fact, the lowest levels of CT ability have been observed among secondary school students (Latifa et al., 2017). The current educational practices have failed to enhance CT, as they primarily focus on outcome-oriented cognitive aspects rather than the process-oriented aspects involving CT abilities. Furthermore, the instructional methods employed by teachers do not promote the acquisition of CT abilities. To foster CT, it is essential to adopt a comprehensive approach utilizing appropriate teaching techniques that enable students to engage in cognitive processes that stimulate their CT abilities (Prayogi et al., 2018). Additionally, students' curiosity in the learning process is not meeting expectations. Ciptasari et al. (2015) discovered that students' curiosity falls within a low category. Moreover, engaging in activities such as questioning and consulting various relevant resources has not resulted in significant improvements in learning outcomes (Nasution et al., 2018). Therefore, it is crucial to invest considerable effort in developing suitable learning strategies that can effectively enhance students' CT abilities and their curiosity.

The learning strategy plays a significant role in influencing students' CT abilities and curiosity, constituting one of the external factors. Additionally, internal factors contribute to these abilities, such as naturalist intelligence. Naturalist intelligence refers to the capacity to process information observed by naturalists (Hayes, 2009). According to Gardener (1999), naturalist intelligence holds the same importance as other forms of intelligence. Nurturing the development of naturalist intelligence in children requires providing an appropriate environment since it is closely connected to their surroundings (Barbiero & Berto, 2018). To optimize the development of a child's naturalist intelligence, stimulation is necessary (Hasanah et al., 2019). Essentially, naturalist intelligence is one facet of the multiple intelligences present in humans, involving sensitivity to natural phenomena, discerning between living and non-living entities (Rohmah, 2016). Indicators of naturalist intelligence in children include an attraction to the natural world, the ability to observe and identify similarities and differences in their surroundings, recognizing patterns in nature, and showing interest in narratives related to natural phenomena (Hasanah et al., 2019). These characteristics progress as children grow older (Hasanah et al., 2019). As highlighted by Roos (2017), individuals possessing a pronounced naturalist intelligence display a notable inclination towards the natural world, evident through their fervent enthusiasm for studying subjects related to nature and its various wonders..

The classroom instruction plays a crucial role in fostering students' CT abilities and nurturing their curiosity. An ideal approach would involve designing instructional methods that enhance both academic performance and students' inquisitiveness. Moreover, it is essential to integrate character education into the learning models, enabling schools to cultivate students' moral values (Dinkha, 2008). By incorporating character-building elements into instructional design, the focus shifts from solely achieving academic outcomes to fostering holistic development. To ensure the effectiveness of instruction in creating a conducive learning environment, it is necessary to adopt a systematic approach and conduct thorough investigations into its impact on thinking skills of the students (Tiruneh et al., 2018; Delaney et al., 2017).

In the current study, researchers have introduced a new approach to problem-based learning called problem-based learning with character development (PBL-CD). PBL-CD aims to enhance students' character by incorporating character content into the structure of problem-based learning. This strategy involves modifying the stages of learning activities to promote character development and expanding the syntax of PBL to encompass character-building elements. As a result, the learning stages in PBL-CD include various activities that encourage students to consciously or unconsciously cultivate their characters while maintaining the essential meaning of PBL.

Prior research has investigated the integration of problem-based learning (PBL) with multimedia and its impact on students' CT abilities (Susilawati et al., 2018). However, it has been observed that utilizing multimedia, including virtual laboratories, does not fully expose learners to real-world scenarios. It is believed that connecting the topics being studied with real-world contexts enhances the training of CT abilities (Hofstein et al., 2001). Consequently, virtual laboratories (virtual fields) cannot entirely substitute for physical laboratories (Cassady et al., 2008). Addressing contextual, complex, and structural problems provides students with valuable opportunities to enhance their analytical, evaluative, and reflective thinking abilities. Additionally, it fosters creativity by encouraging the exploration of diverse information, the development of multiple solutions, and the utilization of various resources to solve problems (Tsai & Chiang, 2013). The implementation of PBL has demonstrated several benefits for students. It increases self-confidence, enhances interpersonal communication, fosters a supportive environment conducive to teamwork, and promotes CT abilities. Furthermore, it facilitates the development of self-awareness (Karen et al., 2018; Aldarmahi, 2016). PBL offers immense benefits to students, enabling them to actively build knowledge, refine their reasoning abilities, cultivate self-directed learning capabilities, and foster a genuine enthusiasm for acquiring new knowledge (Aldarmahi, 2016). This study aimed to investigate the impact of PBL with a focus on character development and naturalist intelligence on students' CT abilities and curiosity.

Research Problems

In the context of the 21st century, the Indonesian education system must prioritize mathematics and science, alongside social and human sciences. The demand for competent individuals in these fields includes those who possess CT abilities and problem-solving skills (Eichmann et al., 2019; Osman, 2010; Oktay & Safak, 2012), as well as the capacity for creativity and innovation (Ertmer et al., 2014). Unfortunately, the current state of secondary education in Indonesia does not place sufficient emphasis on nurturing CT ability. Teachers often fail to conscientiously design and implement learning experiences that promote higher-order thinking skills.

Education is not solely about the transmission of knowledge; it also plays a crucial role in instilling noble values that serve as the foundation for the development of good character (Kobylski et al., 2018; Isdaryanti et al., 2018; Muliastuti, 2017). An essential aspect of good character is curiosity. Consequently, schools must actively encourage students to comprehend and embrace moral values, develop moral sensibilities, and ultimately, exhibit a resolute commitment to translate their knowledge and moral convictions into action. Nevertheless, the full potential of fostering virtuous ideals like curiosity has yet to be effectively actualized. Science teachers often delegate character development to religious educators, and the assessment of students' curiosity is primarily undertaken by teachers for administrative purposes under the supervision of the school principal.

Constructivist learning activities encompass a range of actions that foster knowledge acquisition. These actions comprise keenly observing various phenomena, diligently gathering relevant data, formulating insightful hypotheses, rigorously testing them, and actively engaging in fruitful collaboration with peers. These activities align with the essence of science, encompassing the scientific attitude, scientific processes, and scientific outcomes. The scientific attitude encompasses qualities like curiosity, humility, openness, honesty, embracing failure as a learning opportunity, and taking responsibility. Scientific processes encompass the thinking skills employed by scientists when using scientific methods. Science outcomes include scientific concepts, principles, and theories. However, the reality is that secondary school teachers in Indonesia predominantly rely on traditional teaching methods, with the teacher assuming a dominant role in the learning process. As a result, these conventional instructional approaches fail to foster students' CT abilities or cultivate their curiosity.

Research Focus

This study examined the impact of PBL-CD on students' CT abilities and curiosity, as well as the influence of naturalist intelligence on these skills and curiosity. Additionally, it investigated how the interaction between PBL-CD and naturalist intelligence affected students' CT abilities and curiosity.

METHOD

Research Design

The quasi-experimental research was conducted in a school in the city of Mataram - Indonesia, utilizing a 3x2 treatment by level design. The study included three different treatments (X): problem-based learning with character development (PBL-CD) (X1), PBL (X2), and traditional or regular learning (RL) (X3). These treatments were administered to two groups of students based on their naturalist intelligence: high naturalist intelligence (Y1) and low naturalist intelligence (Y2).

The PBL-CD group received PBL with additional teacher activities aimed at promoting student character development. The PBL groups received learning using PBL strategies alone. The RL group followed the teacher's planned instructional approach. The study focused on a 10-session biology course taught by the same teacher across three groups.

Participants

The study included three distinct groups from two secondary schools, with the participants being selected randomly. The first group, referred to as PBL-CD (X1), consisted of 56 students. The second group, called PBL (X2), included 58 students, and the third group, RL (X3), comprised 56 students. The allocation of students into Y1 and Y2 groups was determined based on their naturalist intelligence test scores. Group Y1 encompassed half of the students who achieved high scores on the test, while group Y2 consisted of the remaining half who obtained low scores on the test.

Instrument and Procedures

In this study, two variables were assessed: students' CT abilities and students' curiosity. The evaluation of students' CT abilities involved the use of essay test instruments, while students' curiosity was measured through self-assessment instruments. Additionally, new instruments were developed to measure natural intelligence, enabling the differentiation of participants based on their naturalist intelligence levels. As a result, each variable had its own dedicated instrument. The process of instrument development included several stages: presenting conceptual definitions of the variables, establishing operational definitions, creating the instrument items, preparing the instruments, determining content validity, and assessing internal consistency and instrument reliability.

Content validity was determined using the Lawshe method, with the CVR (Content Validity Ratio) calculated based on the input from six experts who validated the instruments. The instrument testing phase involved 40 students who were not part of the research sample. The CT abilities test instrument comprised seven essay items, demonstrating internal consistency values ranging from 0.64 to 0.91 and an instrument reliability of 0.95. The self-assessment instrument for students' curiosity consisted of seven items, with internal consistency values ranging from 0.40 to 0.78 and an instrument reliability of 0.88. Lastly, the naturalist intelligence test instrument included 29 items, showing internal consistency values ranging from 0.32 to 0.63 and an instrument reliability of 0.92.

Data Analysis

The analysis of the students' CT abilities and curiosity scores involved the application of descriptive and inferential statistical methods. Descriptive statistics were utilized to assess the levels of CT abilities and curiosity among the students. To test the research hypothesis, a Manova test was employed using inferential statistics at a significance level of 0.05.

RESULTS AND DISCUSSION

Students' CT Abilities

The impact of PBL-CD treatment and naturalist intelligence on CT abilities can be observed through the normalized gain scores (NGs). A comparison of NGs among students in three groups is provided in Table 1. The PBL-CD group exhibits higher average NGs compared to the PBL and RL groups. While both the PBL and RL groups fall under the low category for CT abilities, the PBL-CD group attains the moderate category. Based on this data, it is evident that students taught with PBL-CD display superior CT abilities compared to the PBL and RL groups. Table 1 also demonstrates a comparison of NGs between students with high (Y1) and low (Y2) naturalist intelligence in groups X1, X2, and X3. Across all three treatment groups, the average NGs of students in the X1 group surpass those in the X2 group. These results indicate that students with high naturalist intelligence exhibit better CT abilities than those with low naturalist intelligence. Furthermore, PBL-CD proves to be more effective than RL in enabling a significant number of students to achieve very high and high categorizations. Figure 1 illustrates the distribution of students' abilities in CT abilities based on NGs.

Table 1. The analysis results of students' CT abilities based on NGs

Groups	Naturalist Int.	Mean	SD	N
(X1) PBL-CD	(Y1) High	0.423	0.183	28
	(Y2) Low	0.408	0.187	28
	Total X1	0.416 (*Moderate Criteria*)	0.184	56
(X2) PBL	(Y1) High	0.352	0.197	29
	(Y2) Low	0.250	0.205	29
	Total X2	0.301 (*Low Criteria*)	0.206	58
(X3) RL	(Y1) High	0.306	0.295	28
	(Y2) Low	0.276	0.246	28
	Total X3	0.291 (*Low Criteria*)	0.270	56

The data presented in Figure 1 indicates that students belonging to the PBL-CD group exhibited a higher occurrence of the moderate category in comparison to both the PBL and RL groups. This suggests that the utilization of PBL-CD as a learning approach yields superior results in enhancing students' CT abilities.

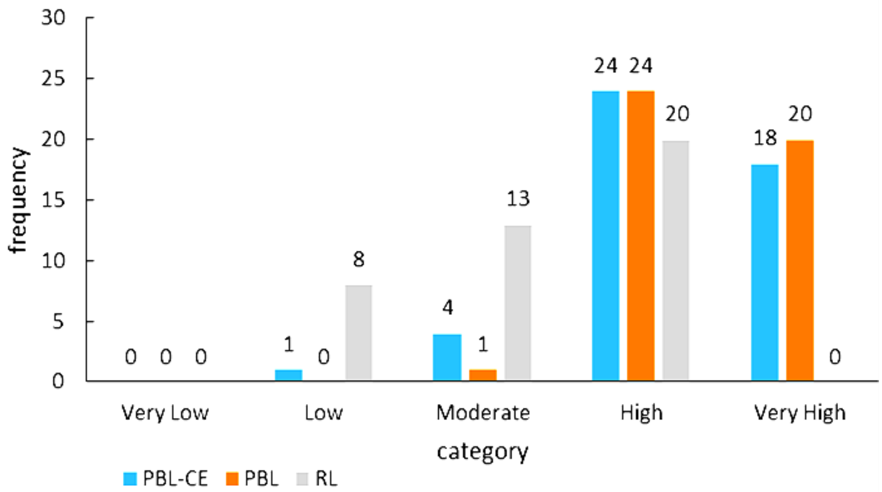

Figure 1. The frequencies of students' CT abilities were compared across three groups, focusing on the distribution of NGs within each category

Students' Curiosity

The evaluation of students' curiosity took place once the treatment had concluded. The findings from the data analysis, utilizing descriptive statistics, are presented in Table 2. These results indicate variations in the average scores and curiosity categories among the three groups. The PBL-CD group displays a higher average curiosity score compared to both the PBL and RL groups. While the PBL-CD and PBL groups fall under the same category, classified as good, the RL group's curiosity is categorized as fair. In summary, based on the data, it can be observed descriptively that the students taught with PBL-CD exhibit superior curiosity compared to the PBL and RL groups.

Table 2. The analysis results of students' curiosity

Groups	Naturalist Int.	Mean	SD	N
(X1) PBL-CD	(Y1) High	3.080	0.266	28
	(Y2) Low	3.050	0.272	28
	Total X1	3.032 (*Good Criteria*)	0.268	56
(X2) PBL	(Y1) High	3.088	0.250	29
	(Y2) Low	3.027	0.389	29
	Total X2	3.057 (*Good Criteria*)	0.325	58
(X3) RL	(Y1) High	2.925	0.406	28
	(Y2) Low	2.853	0.274	28
	Total X3	2.890 (*Fair Criteria*)	0.345	56

Table 2 illustrates the comparison between students' curiosity scores in relation to their naturalist intelligence levels (high, Y1, and low, Y2) across three groups: X1, X2, and X3. The average curiosity score of students in the X1 group surpassed that of the X2 group in all three categories. These findings suggest that students with high naturalist intelligence exhibit a greater level of curiosity compared to those with low naturalist intelligence. Moreover, the implementation of PBL-CD (Problem-Based Learning with Curriculum Design) proved to be more effective in fostering high and good curiosity levels among students, as opposed to RL (traditional learning approach). The distribution of students' caring scores is graphically presented in Figure 2. Notably, the PBL-CD group displayed a higher frequency of students falling into the good category compared to the PBL and RL groups. This observation further supports the notion that PBL-CD had a more positive impact on students' curiosity.

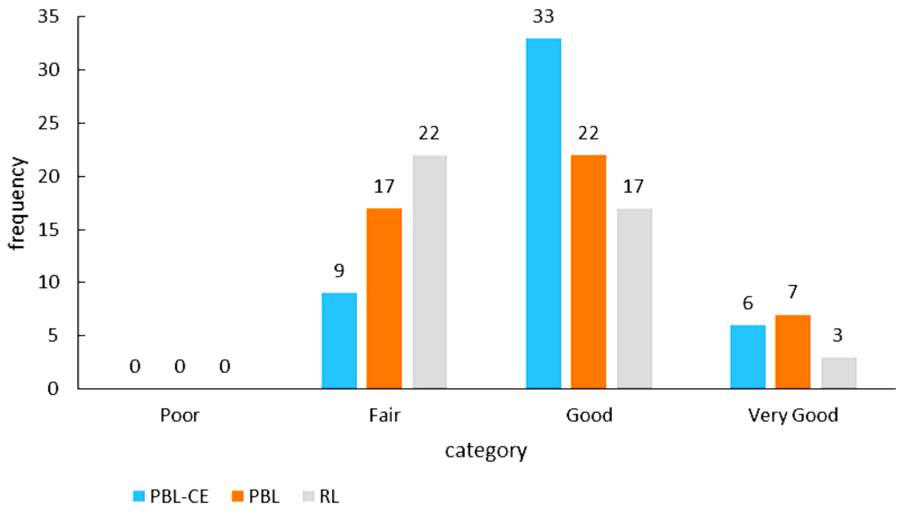

Figure 2. An analysis was conducted to compare the distribution of students across three groups, categorizing them according to their curiosity score.

Hypothesis Testing

To examine the primary and individual effects at a significance level of 0.05, hypothesis testing was conducted on the MANOVA using SPSS version 23.0. Table 3 displays the outcome of the analysis.

Table 3. The results of MANOVA

Effect	F	Sig.
Intercept	7.600	0.000
Groups	4.822	0.001
Naturalist Int.	1.093	0.338
Groups * Naturalist Int.	0.621	0.648

Table 3 reveals the following findings: (1) PBL-CD has a noteworthy impact on students' CT abilities and curiosity; (2) naturalist intelligence does not significantly affect students' CT abilities and curiosity; and (3) the combined influence of PBL-CD and naturalist intelligence does not significantly impact students' CT abilities and curiosity.

The subsequent analysis aims to examine the influence of PBL-CD variables and naturalist intelligence on each aspect of students' CT and curiosity. The outcomes of this analysis are presented in Table 4. Notably, Table 4 demonstrates significant variations in the average scores of students' CT abilities and curiosity among the PBL-CD, PBL, and RL groups. Hence, the adoption of PBL-CD as a learning approach directly influences students' CT abilities and curiosity.

Table 4. The test of between-subject effects

Source	Variable	SS	df	MS	F	Sig.
Groups	[a]CT abilities	0.540	2	0.270	5.479	0,005
	[b]Curiosity	0.928	2	0.464	4.658	0,011
Naturalist Int.	[a]CT abilities	0.103	1	0.103	2.081	0,151
	[b]Curiosity	0.029	1	0.029	0.287	0,593
Groups * Naturalist Int.	[a]CT abilities	0.062	2	0.031	0.627	0,535
	[b]Curiosity	0.140	2	0.070	0.704	0,496
Error	[a]CT abilities	8.086	164	0.049		
	[b]Curiosity	16.335	164	0.100		
Total	[a]CT abilities	27.884	170			
	[b]Curiosity	1540.959	170			
Corrected Total	[a]CT abilities	8.793	169			
	[b]Curiosity	17.432	169			

The researchers conducted a post hoc test to determine which group had the most significant impact on the students' variables. The findings reveal notable variations in the average scores of students' CT abilities and curiosity. Specifically, students who were taught using the PBL-CD approach achieved significantly higher average scores in CT compared to both the PBL and RL groups. Therefore, the PBL-CD treatment emerges as the most effective method for enhancing students' CT abilities. Additionally, Table 5 indicates that students taught with the PBL-CD approach obtained higher average scores in curiosity, which were not significantly different from the PBL group but significantly different from the RL group.

Nevertheless, the PBL-CD treatment remains the superior choice for fostering students' curiosity. Detailed results of the analysis can be found in Table 5.

Table 5. The LSD test results

Variable	Groups (I)	Groups (J)	Mean Diff. (I-J)	SE	Sig.
CT abilities	PBL-CD	PBL	0.115*	0.042	0.006
		RL	0.125*	0.042	0.003
	PBL	PBL-CD	-0.115*	0.042	0.006
		RL	0.009	0.042	0.821
	RL	PBL-CD	-0.125*	0.042	0.003
		PBL	-0.009	0.042	0.821
Curiosity	PBL-CD	PBL	-0.025	0.059	0.667
		RL	0.143*	0.059	0.018
	PBL	PBL-CD	0.025	0.059	0.667
		RL	0.168*	0.059	0.005
	RL	PBL-CD	-0.143*	0.059	0.018
		PBL	-0.168*	0.059	0.005

The current research presents significant findings on the impact of PBL-CD (Problem-Based Learning with Character Development) and naturalist intelligence on students' CT abilities and curiosity. The results indicate that PBL-CD has a positive effect on both CT abilities and curiosity. Specifically, the PBL-CD treatment proves to be more effective in enhancing students' curiosity compared to the PBL and RL treatments.

In the PBL-CD approach, deliberate efforts were made by the teacher at each stage of the learning process to incorporate character development, including fostering a caring character. Various activities were designed to encourage and reinforce specific characteristics, such as curiosity about environmental and social issues. Through PBL-CD, students were exposed to authentic problems in their immediate surroundings, which they encountered in their daily lives. The use of visual media and news materials pertaining to environmental issues facilitated the development of their thinking skills (Sutarto et al., 2018). During PBL-CD, students were motivated to cultivate curiosity by engaging with the presented problems related to their environment.

Furthermore, the study's results indicate that naturalist intelligence and the interaction between PBL-CD and naturalist intelligence do not have a significant impact on students' CT abilities and curiosity. The activation of CT abilities and curiosity through PBL-CD does not appear to depend on students' naturalist intelligence levels. Both high and low naturalist intelligence students benefit from PBL-CD and PBL, as these approaches require active participation in problem analysis, idea generation, information gathering, hypothesis building, problem-solving strategies, and logical reasoning. According to Witte and Rogge (2016), students in PBL settings do not consistently outperform those in traditional classrooms in terms of knowledge acquisition or problem-solving abilities.

The present study introduces a novel approach known as problem-based learning with character emphasis (PBL-CE) treatment. The research reveals that this approach effectively stimulates students' development of advanced CT abilities and curiosity, surpassing the outcomes achieved through traditional problem-based learning and regular learning methods. PBL-CE engages students in interactive problem-solving activities related to environmental issues, encouraging them to pose both closed and open questions regarding the problems presented by their teacher. Research conducted by Almulla (2018) suggests that students who frequently ask open questions exhibit superior CT abilities. Successful problem-solving in this context necessitates analytical and CT abilities, including the analysis of potential solutions, evaluation of problems and available alternatives, and the capacity to design innovative problem-solving approaches. These competencies are consistently nurtured within the PBL-CE framework, regardless of students' levels of naturalist intelligence. In contrast, conventional learning approaches often position students as passive recipients of information, which can lead to a decline in their analytical, evaluative, and creative capacities, as well as a weakening of their character development. According to Aldarmahi (2016), PBL enables students to integrate fundamental scientific knowledge with real-life problems more effectively than conventional learning systems.

CONCLUSION

PBL-CD has a significant impact on students' CT abilities and curiosity, facilitating the development of higher-level skills and fostering inquisitiveness. It serves as an effective approach for enhancing these aspects among students. Conversely, naturalist intelligence does not exert a notable influence on students' CT abilities or curiosity. Furthermore, the interaction between PBL-CD and naturalist intelligence does not affect these areas. Regardless of their naturalist intelligence levels, students respond similarly to PBL-CD, PBL, and RL. The explicit implementation of character traits within PBL allows for detailed and operational integration, enabling activities that promote CT abilities and nurture curiosity during the learning process. To facilitate this, teachers are encouraged to be creative in designing learning resources, including worksheets, tools, materials, and assessment instruments that accurately evaluate CT abilities and student curiosity.

RECOMMENDATION

However, this study has certain limitations. It solely focuses on measuring CT and curiosity, overlooking the potential connection between character emphasis and naturalist intelligence with environmental attitudes. Additionally, the study is limited to biology courses, specifically on the topic of ecosystems and environmental change, taught by the same teacher across three groups. These factors may restrict the generalizability of the findings, as students in the three classes might experience boredom, potentially influencing the results. To address these limitations, future research can explore the effects of the proposed model on environmental attitudes and consider other variables like learning motivation. Moreover, conducting the study across different schools or classes with varied teachers and expanding the topics beyond biology can help enhance the reliability and applicability of the findings. Despite the limitations, the current study's findings provide a valuable foundation for future research in this field.

Author Contributions

The authors have sufficiently contributed to the study, and have read and agreed to the published version of the manuscript.

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Declaration of Interest

The authors declare no conflict of interest.

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