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INCREASING STUDENTS' CAPACITY IN FLOOD DISASTER THROUGH LEARNING WITH PROBLEM-BASED LEARNING MODEL WITH RELIGIOUS BEHAVIORISTIC APPROACH

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ABSTRACT

This research examined the enhancement of students' preparedness in facing disasters, particularly flood disasters, through the integration of Problem-Based Learning (PBL) and a behavioristic-religious approach. The research aimaned to understand how religious values and behavioristic teaching methods could improve students' awareness and capacity to effectively respond to flood disasters. A qualitative research methodology was employed, with data collected through interviews, observations, focus discussions (FGD) and document analysis from teachers and students in elementary schools. The data were analyzed using triangulation with disaster and religious experts. The findings indicate that disaster education knowledge utilizing a behavioristic-religious approach was generally well understood by school stakeholders, including teachers, principals, and school boards, with 86% demonstrating a good understanding. However, some informants had limited understanding of this approach, highlighting the need for broader implementation not only among students but also among school stakeholders. Additionally, the majority (around 80%) of respondents identified lectures and Q&A sessions as effective teaching methods, while only a small portion emphasized the importance of simulations reinforced with religious values. Regardless of these benefits, issues such as curriculum mapping, teacher training, and the inclusion of religious instruction to accommodate diverse student backgrounds. This research concluded that the integration of PBL with religious behavioristic reinforcement improved disaster literacy, preparedness, and spiritual resilience among students. Future studies should investigate hybrid models integrating behaviorism with other student-centered learning approaches to further maximize disaster education strategies.

Keywords: *PBL; Behavioristik; Religious*

INTRODUCTION

One of the most common environmental problems in Indonesia related to natural and human phenomena is flooding (Ariyora, et al., 2015). A disaster is becoming a great issue and it always happens nowadays. Flooding is one of the natural phenomena or disasters that often occur in Indonesia, especially big cities

like Jakarta. Floods that occur in Jakarta form a periodization event or return time (Ariyora, et al., 2015). Flood disasters have a tremendous impact on schools, particularly in affected areas like SDN 05 Bidara Cina, where they can damage school facilities and infrastructure. The floods severely impacted schools, damaging facilities and infrastructure. Furniture like chairs, tables, and wardrobes, along with school equipment, were destroyed or washed away. Teaching materials and documents were also ruined. Research by previous study around 7 schools in Lebak Banten sub district revealed a low level of disaster preparedness among the school community. Of the five disaster preparedness parameters assessed, only the knowledge and attitude parameters received high scores (Muzani et al., 2020). School is one of the main stakeholders in disaster education. School has enormous potential as a source of knowledge, dissemination of knowledge about disasters and practical guidance on what must be prepared before a disaster occurs and what must be done during and after disaster. Literacy serves as an important factor in the education and learning process at school equipping the community with the necessary skills to survive disaster risks. Furthermore, access to disaster-related information is a key component of school preparedness, as it forms part of the emergency action plan (Prananingrum et al., 2023; Suharini et al., 2019).

However, ensuring effective disaster preparedness requires an appropriate learning approach that enhances students' engagement and problem-solving abilities. One effective strategy is the implementation of the Problem-Based Learning (PBL) model, which encourages students to actively analyze real-world problems, collaborate, and develop solutions independently (Meilasari & Yelianti, 2020). PBL facilitates contextual learning by connecting theoretical knowledge with practical disaster preparedness actions, ensuring that students internalize and apply their understanding effectively (Yulianti & Gunawan, 2019). Additionally, interactive learning elements have been found to significantly improve student engagement, making disaster preparedness education more effective. Research also indicates that integrating geospatial data into educational narratives can enhance students' understanding of flood risks and response strategies. A post-

implementation survey showed that 92% of participants felt more prepared for flood events after engaging with such interactive learning methods, reinforcing the importance of digital tools in disaster education (A'rachman et al., 2024). The problem-based learning model is one of the student-centered learning models (Wulandari, et al., 2021). Students' social skills can be developed and improved in solving problems, and critical thinking (Wahyuningtyas et al., 2021; Dewi et al., 2016; Andari et al., 2019; Supiandi & Julung, 2016).

Additionally, behaviorism-based learning principles can further strengthen disaster preparedness education by reinforcing structured, repetitive training and conditioning desired behaviors. By applying behaviorist approaches, students can develop automatic responses to disaster situations through drills, simulations, and reinforcement strategies, ultimately enhancing their readiness and resilience in real disaster scenarios.

Behaviorism views the learning process as a change in observable behavior resulting from an individual's experience interacting with their environment (Prahmana, 2015). According to Sugiyono & Hariyanto in (Wiyani & Irham, 2015), the focus of the behavioristic learning process occurs when there is an interaction involving a stimulus and a response or an observable and measurable output. Behavioristic learning is a branch of psychology that emphasizes observable and objectively measurable student behavior. This approach enables teachers to design effective strategies to redirect behavior through environmental manipulation and appropriate reinforcement. In this study, this is applied by integrating religious values into the learning process to cultivate disaster-responsive behavior among students (Rizqiyul Azima et al., 2024). The behavioristic approach in the learning process is centered on students, providing stimulus through the implementation of religious behavior habituation (Novitasari et al., 2023). Therefore, behaviorism plays an important role in shaping students' religious behavior (Yudin et al., 2023). The goal of applying behaviorism theory is to create the desired behavior. Appropriate behaviors are reinforced positively, while inappropriate behaviors receive negative consequences. The instillation of moral values applied by students and observable in their daily lives, both in school and in the community, is an impact of the

behavioristic approach to learning (Hadi et al., 2022).

According to research by Lei Sun, Yan Deng, and Wenhua Qi, in some situations, religious beliefs and the religious interpretation ofs natural disasters may limit people's ability to take action in disaster preparedness. However, from a psychological perspective, religious traits can enhance and encourage both individual and community resilience in the face of disaster. During a disaster, individuals can find essential spiritual support from their faith in a higher power and also access crucial support and resources provided by their faith-based social networks. In terms of disaster risk reduction, it is important for policymakers and practitioners to recognize and leverage the positive effects of religious belief while also working to mitigate any negative impacts where they may pose challenges (Sun et al., 2018).

This research offers a fresh approach to disaster preparedness education by enhancing students' capacity to respond to flood disasters through a problem-based learning model enriched with a religious behavioristic approach. Unlike prior studies that often focus solely on general preparedness or infrastructural resilience, this research specifically integrates religious values within behavioristic learning to build both the practical skills and psychological resilience of students. Specifically, the study was conducted in Kelurahan Jatinegara Kaum, where one neighborhood (RT) was affected by flooding on February 27, 2023, with water levels reaching 20 cm. The flood impacted several areas, including SDN Jatinegara Kaum, located within the affected zone.

Figure 1. Situation during the flood at the SDN Jatinegara Kaum 03 Jakarta location

Conducted in a sixth-grade classroom at SDN Jatinegara Kaum 03 Jakarta (**Figure 1**), which includes students from Islamic and Christian backgrounds, this study uniquely examines how religious teachings can be utilized alongside problem-based learning to improve students' response to disaster risks. This approach not only reinforces disaster awareness but also taps into the spiritual and moral dimensions of learning, offering a holistic framework for educators and policymakers to strengthen disaster preparedness in religiously diverse environments.

Therefore, the researcher conducted this study to delve into the spirituality of Islamic and Catholic faiths, which are universal and highly tolerant, using the behavioristic approach within problem-based learning as a disaster mitigation effort. Based on this background, the research problem is formulated as increasing students' capacity in flood disaster response through problem-based learning with a religious behavioristic approach. This research was conducted at SDN Jatinegara Kaum 03 Jakarta in a sixth-grade class with a total of 36 students, consisting of 6 Christian students and 30 Muslim students.

MATERIALS AND METHODS

The research adopts a qualitative approach aimed at exploring the integration of religious behavioristic principles into disaster education for elementary school students. The study was conducted at SDN Jatinegara Kaum 03 Jakarta (**Figure 2**), focusing on 36 sixth-grade students (30 Muslim and 6 Christian) as supporting informants, alongside school principals and teachers as key informants. The class selected for this study consists of students with religious backgrounds in Islam and Christianity therefore, the integration of religious values in this research is limited to approaches based on Islamic and Christian perspectives.

Data collection methods included classroom observation, semi-structured interviews, focus discussions (FGDs) and document analysis. Observations were conducted during disaster education activities to evaluate student engagement, participation, and understanding of disaster preparedness within the framework of religious behavioristic approaches. Semi-structured interviews with school principals and teachers provided insights into their perceptions and strategies for integrating disaster education with religious values. Focus

group discussions were conducted twice to explore in-depth information regarding students' experiences, perceptions, and understanding of disaster preparedness education combined with religious values Document analysis focused on lesson plans, educational materials, and school disaster policies to assess their alignment with disaster preparedness objectives. To ensure data validity and reliability, triangulation was carried out by consulting disaster management experts to verify the technical feasibility of the teaching methods and religious leaders to validate the appropriateness of the spiritual content in promoting disaster preparedness.

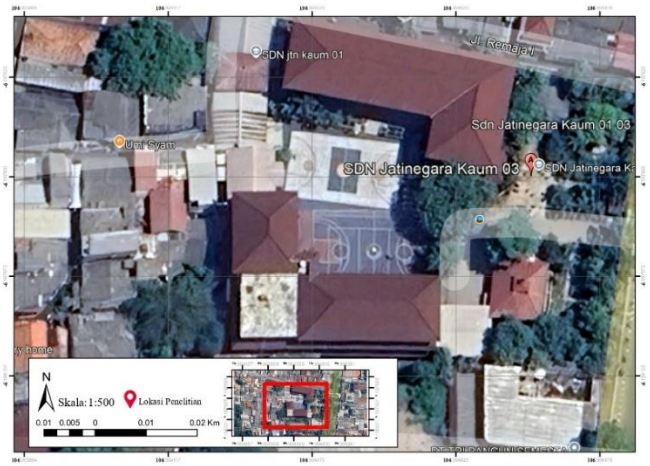

Figure 2. Map of Research Location, SDN Jatinegara Kaum 03 Jakarta

RESULTS AND DISCUSSION

Disaster preparedness knowledge in schools largely recognizes the occurrence of various disasters, such as floods, earthquakes, droughts, storms, tsunamis, and others. This reality emphasizes the need for disaster education using a religious-based behaviorism approach, which aims to provide understanding, knowledge, and preparedness to act when a disaster occurs and threatens the community. However, students have not yet received structured and formal education on disaster preparedness with a religious-based behaviorism approach, as they generally learn about disasters from media sources like newspapers, TV, social media, online media, and others, which leads to limited understanding. To validate evaluate disaster effectiveness in the context of religious-based behaviorism approach, observation in the classroom were conducted to assess

students' engagement, participation, understanding and awareness of disaster preparedness. The observations revealed a notable improvement in students' comprehension and response to disaster situations after participating in structured learning activities. In addition, semi-structured interviews with teachers and students showed that habit formation through reinforcement practices was pivotal in establishing the readiness and response levels of the students. Confirming previous research on disaster readiness, research at SMA Negeri 1 Perhentian Raja, Kampar Regency, Highlights the impact of flooding on school facilities and pedagogical implementation. The study found that although teachers were categorized as 'ready' in dealing with floods, further improvements are needed in preparedness strategies to ensure minimal disruption to education (Putri, R. Y., & Hermon, D., 2025). Advance supporting the role of technology in disaster education, a research conducted at SMA Negeri 2 Surakarta investigated the development and effectiveness of Flash Macromedia-based learning media integrated with the Problem-Based Learning (PBL) approach.

The research showed that the use of Flash Macromedia significantly improved the knowledge and level of interest of students compared to traditional learning processes (Ridhowati, 2016). These findings align with the present study's emphasis on integrating problem-based learning and a religious behavioristic approach to strengthen not only students' readiness but also teachers' ability to effectively manage disaster situations. The combination of structured preparedness training and reinforcement of religious values can contribute to more resilient educational institutions in disaster-prone areas.

Regarding which subject is most relevant for incorporating disaster education with a religious-based behaviorism approach, Science, Environment, and Social Studies (IPAS) is predominantly chosen. Based on curriculum analysis and the identified need for disaster-related information, IPAS is indeed the most suitable subject, particularly concerning materials on threats to our planet (Wijayanti, 2023)

The research findings also emphasize the importance of educating not only students but also stakeholders, including teachers, school principals, and school boards, about disaster education with a religious behavioristic approach. Survey data

indicate that 86% of teachers, principals, and school board members have a good understanding of this approach, while 14% have limited or no knowledge of it. Additionally, 80% of respondents consider lectures and discussions the most effective teaching methods, while fewer respondents prefer simulation-based learning with religious reinforcement. These findings highlight the need for broader implementation of disaster education programs that incorporate both religious and problem-based learning approaches.

Figure 3. Offline learning that incorporates religious values

Learning that integrates religious values is considered highly effective in disaster education, including its mitigation, One successful implementation strategy involved Focus Group Discussions (FGDs), which were conducted twice to explore in-depth information regarding students experiences, perceptions and understanding of disaster preparedness education with religious values. Following these discussions, one example being group presentations discussing various environmental issues caused by human actions. Students were visibly enthusiastic and actively asked questions, which indicates that visualizing different forms of disasters and their mitigation is crucial to concretize abstract concepts for students, as disasters may not yet be perceived as concrete and operational events which can be seen in **Figure 3**. The religious values embedded in disaster education with a behavioristic religious approach include values from sacred texts that emphasize spiritual values and balanced spiritual principles, reinforcing both knowledge and skills with spiritual values. Religious aspects drawn from sacred texts include, among others.

Islam encompasses three concepts particularly relevant to disaster risk reduction: Al-Ilmu (knowledge), Ikhtiar (effort), and Tawakkul (trust in God).

Islam teaches that the pursuit and application of knowledge are fundamental obligations for every Muslim (Aksa, 2020; Abukari, 2014). In Islamic teachings, Al-Ilmu is highly esteemed, as it enables individuals to understand and address life's challenges, enhancing their ability to help others. These concepts are closely tied to hablum minallah (relationship with Allah) and hablum minannas (relationship with fellow humans). By pursuing knowledge and striving (Ikhtiar) to apply it wisely, Muslims fulfill their responsibility to Allah, reflecting a deep commitment to hablum minallah. Additionally, the knowledge gained and shared benefits the community, fulfilling hablum minannas by allowing individuals to assist others and contribute to communal well-being. In disaster risk reduction, these values ensure that efforts to mitigate harm are grounded in faith, knowledge, and mutual support. Attitudes needed in pre-disaster aspects with religious behavioristic shown in **Table 1**.

Table 1. Attitudes Needed in Pre-Disaster Aspects with Religious Behavioristic

Quotations from the Bible			**Quotations from the Quran**		
Prepare	Ready For Trials	Stay vigilant	Prepare	Ready For Trials	Stay vigilant
Romans 15: 4	Ephesians 6:10-11	Peter 1:13	An-Nahl: 90	Al-Ankabut: 2-3	Al-Insyirah: 5-6

Attitudes of Learners with Problem Based Learning Model in Religious Behavioristic Approach in Syntax 1: Students identify issues related to what elementary school-aged students need to prepare for before a flood disaster occurs. Syntax 2 and 3: Students search for and read various online resources as a way to strengthen their knowledge within their groups. Syntax 4 and 5: Students discover what needs to be prepared to face the flood disaster. Attitudes of Students, 1) Students become more trusting in God, starting everything with a prayer, such as when beginning their learning activities, heading home, and never forgetting to express gratitude for every comfort they experience, 2) Students are vigilant in facing disasters because they know what needs to be prepared when dealing with such situations, 3) Students become more confident in their actions by holding firmly to God in every step they take, students gain greater confidence in learning, for example, they are better able to express opinions and engage in discussions with their peers and

educators during lessons, and 5) Students are able to consider their decisions carefully to avoid making mistakes when making important choice. Attitudes needed in aspects during disaster with religious behavioristic shown in **Table 2.**

Table 2. Attitudes Needed in Aspects During Disaster with Religious Behavioristic

Quotations from the Bible				**Quotations from the Quran**			
Not panicking	Hope in God	Stay faithful/believe	Do Not Despair/Stay Enthusiastic	Not panicking	Hope in God	Stay faithful/believe	Do Not Despair/Stay Enthusiastic
Philippians 4:6-7	Psalm 46:1-2:	Jeremiah 17:7	Job 12:14-16	Al-Baqarah:153	Al-Insyirah: 5-6	At-Talaq:2	Al-Baqarah:7

Attitudes of Learners with Problem Based Learning Model in Religious Behavioristic Approach; Syntax 1: Students identify the problems they face during floods or they literate themselves by observing what the community faces when floods arrive. Syntax 2 and 3: Students search for and read several online reading sources to strengthen their knowledge in groups. Syntax 4 and 5: Students discover what actions should be taken when a flood occurs and students engage in group discussions. Religious behavioristic approach; the teacher provides reinforcement from a religious aspect to students after the discussion concludes and students summarize. Attitudes of Students; by starting each learning session with a prayer to seek peace and guidance from God Almighty in conducting the learning activities, providing a sense of hope to students in completing tasks, assuring them that God always listens and provides the best outcomes, by reading and continually remembering God's goodness according to religious teachings and during the learning process, students are better able to calm themselves and have reinforcement to encourage others that in every problem (disaster) there is always a solution. Attitudes needed in after disaster aspects with religious behavioristic **Table 3.**

Attitudes of Learners with Problem Based Learning Model in Religious Behavioristic Approach; Syntax 1: Students identify the problems they face after a flood has occurred or they literate themselves by observing what the community faces after the flood disaster is over, considering various losses, both

physical and material. Syntax 2 and 3: Students search for and read several online reading sources to strengthen their knowledge in groups. Syntax 4 and 5: Students discover what actions should be taken when a flood is over. Students engage in group discussions. Religious Behavioristic Approach; the teacher provides reinforcement from a religious aspect to students after the discussion concludes, students summarize their learning. Attitudes of Students; by starting each learning session with a prayer to seek peace and guidance from God Almighty in conducting the learning activities, providing a sense of hope to students in completing tasks, assuring them that God always listens and provides the best outcomes, by reading and continually remembering God's goodness according to religious teachings, during the learning process, students are better able to calm themselves and have reinforcement to encourage others that in every problem (disaster) there is always a solution.

Table 3. Attitudes Needed in After Disaster Aspects with Religious Behavioristic

Quotations from the Bible			**Quotations from the Quran**		
Do Not Be Disappointed With God	Stay Resolut	Improve and Care for Nature	Do Not Be Disappointed/ With God	Stay Resolut	Improve and Care for Nature
Proverbs 17:22	Corinthians 10:13	Psalm 107:36-37	Al-Ankabut. 5	Al-Baqarah. 248	Al-A'raf, 56

PBL emphasizes activities from students to be able to find solutions and be able to solve problems in real life (Meilasariet al., 2020). PBL in the learning process actively collaborates with each other, formulates problems, analyzes their lack of knowledge, and independently searches for relevant information and solutions, the problem-based learning model is one of the student-centered learning models (Yulianti et al., 2019; Wulandari, et al., 2021). Students' social skills can be developed and improved in solving problems, and critical thinking (Wahyuningtyas et al., 2021; Dewi et al., 2016; Andari et al., 2019; Supiandi et al., 2016). PBL is very influential in improving critical thinking skills, and can train students to stimulate critical thinking in solving problems around them (Sari et al., 2017; Tyas, 2017; Wulandari, et al., 2021; Setyawan, et al., 2021).

In the focus of the learning process, behavioristic theory is needed, this theory occurs when there is interaction with stimulus and response or output that can be observed and can be measured by implementing religious behavior habituation (Irham & Wiyani, 2015; Novitasari, G., 2023). Behavioristic theory views that the learning process is a visible change in a person's behavior which is the result of experience interacting with the environment (Prahmana, 2024). Therefore, behaviorism holds an important function in providing positive reinforcement of behavior and can shape students' religious behavior (Kartini, Iin, et al., 2024; Yudin Fithri et al., 2023). The embedding of moral values and behavioral changes that integrate religious values applied by students and can be observed in their daily lives and the environment both at school and society is the impact of learning a behavioristic approach (Hadi, A., & Sari, I. 2022; Novitasari, G., 2023). The problem-based learning model combined with a religious behavioristic approach can increase the capacity of students in flood disasters. Several previous studies support this statement Sari, et al., (2023) show that in the implementation of learning using a problem-based learning model can improve social studies learning outcomes in elementary school students who encourage active and motivated students so that student learning outcomes increase. This is in line with research conducted by Wulandari, et al., (2021) which shows that the Problem-based learning model in its use has a significant effect on student learning motivation. Suharini, et al., (2019) Disaster mitigation literacy was significantly higher in the experimental class (level 5) compared to the control class (level 3). The study suggests that effective strategies for enhancing literacy include using PBL for education, improving science literacy through varied readings, and fostering individual awareness and skills related to local disasters. Purnamasari, E. (2018) Problem-Based Learning model on students' critical thinking skills, there is a significant effect of PAI learning using the Problem Based Learning model on student learning outcomes. Yudin, et al (2023) The application of student religious character education using behavioristic theory of habituation patterns for students at Al Muttaqin madrasah ibtidaiyah in their religious activities results in the formation of students' religious attitudes.

Hadi et al,. (2022) The behavioristic learning theory approach to the application of Islamic religious education learning familiarizes the embedding of moral values and is applied in everyday life. The floods in the area caused extensive damage to schools, affecting infrastructure and facilities. Furniture, equipment, teaching materials, and documents were destroyed or washed away. At State Elementary School 05 Bidara Cina, flooding even reached the second floor, as reported in an interview. The school, built by the government, was severely impacted by the flood.

These findings are in line with the current research approach, reinforcing the importance of utilizing technology-enhanced learning strategies to strengthen disaster education and preparedness among students. From the discussion, the problem-based learning model combined with the religious behavioristic theory approach can increase the capacity of students in flood disasters. So that the learning model and behavioristic theory approach are very effective and can be applied to the learning process. It is hoped that with the implications of this research teachers can use the problem-based learning model with a religious behavioristic theory approach. Learners can apply this behavioristic theory in their daily lives to be more prepared and responsive in dealing with flood disasters. Although this approach has been found to be useful, its implementation faces several challenges. Curriculum alignment and teacher preparedness are among the first in line and play a fundamental role in its success. Teachers must undergo proper training in order to use religious-based disaster education as a part of regular subjects. Second, religious and cultural diversity of schools must be appropriately addressed in a way that disaster education resources are inclusive and unbiased.

From a policy perspective, the findings of this research emphasize the need for educational institutions and policymakers to develop a structured disaster preparedness curriculum that incorporates religious and behavioral principles. From a policy perspective, the findings of this research emphasize the need for educational institutions and policymakers to develop a structured disaster preparedness curriculum that incorporates religious and behavioral principles. Comparative studies with other disaster education models, such as Problem-Based Learning (PBL), indicate that the behaviorism-based approach

offers greater consistency in developing automatic disaster response behaviors due to its reinforcement and repetition mechanisms. However, further research is needed to explore how a hybrid model combining behaviorism and PBL could enhance disaster preparedness education.

CONCLUSIONS

The religious behavioristic inspired Project-Based Learning (PBL) model approach not only improved the cognitive capacity of students but also provides significant mental and spiritual support related to disaster preparedness. The process enchances students' overall competencies, encompassing knowledge, attitudes, and behaviors in dealing with disaster situations, while maximizing cognitive development through religious values taught in the Bible and the Quran. The direct effect of this learning is seen in the increased understanding and preparedness of students for disasters, while the secondary effect includes the development of character and religious attitudes that support positive behavior in emergencies. Data observed in the classroom, discussions, and gathered trough students responses indicated that student portrayed increased disaster preparedness, both in knowledge and behavioral responses. However, the implementation of this approach faces challenges, including the need for structured teacher training, curriculum alignment, and inclusivity in religious teachings to accommodate students' diverse backgrounds. To gain ultimate effectiveness, this model of learning needs to be implemented systematically across levels of education. Experiential learning by narrative and active exercises can provide introductory disaster preparedness concepts at the elementary school level. Policy support from schools and teacher training programs are also necessary for long-term use. More studies are recommended to assess the long-term impact of this model and investigate hybrid models that include behaviorism with other mechanisms of student-centered learning.

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