Building 21st-century skills through the recent behavioral learning for students outcome

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Abstract

This study aims to explore the implementation of behavioristic learning theory in the context of 21st-century basic education in Indonesia. This study uses the Systematic Literature Review (SLR) method to understand how behavioristic principles can be integrated into modern teaching practice from 10 reputable journals (Scopus and Sinta), the research stages included planning, conducting, and reporting. Research result in this study suggests that the implementation of behavioristic theory requires a good classroom environment and the use of reward and punishment schemes to shape student behavior. Teachers are expected to be actively involved in the learning process, provide constructive criticism, and conduct an initial analysis of students' ability to design appropriate lesson plans. This research offers novelty in integrating behavioristic theory into modern basic education in Indonesia and makes practical contributions for teachers and implications for the education system to achieve national education goals. This research supports developing quality and sustainable human resources towards a Golden Indonesia 2045.

INTRODUCTION

Background of the Study

Education guides children's natural strengths, ensuring safety and happiness as humans and society members. Teaching provides knowledge for physical and mental life skills. Thus, education and teaching are efforts to prepare and provide for all the needs of human life, both in social life and cultural life in the broadest sense. Children in Indonesia are expected to be able to reflect Pancasila, have a global perspective, and have 21st-century skills (Putri et al., 2023). Education is about

transferring knowledge or values, training skills, and developing students' potential (Rochmawati, Annisa, Wiyanto, dan Ridlo, 2020). National Education in the 21st century aims to realize the nation's ideals, namely a prosperous and happy Indonesian society, with an honorable and equal position with other nations in the global realm, through the formation of a society consisting of quality human resources and sustainable life through quality education by sustainable development goals towards a golden Indonesia 2045 (Mogren et al., 2019).

Primary education in Indonesia has various challenges, including the quality of teaching, limited resources, and the need to integrate technology into the learning process. In addition, there is an urgent need to develop 21st-century skills in students, which is the main focus of national education policy (Ajpru et al., 2014). Therefore, it is important to examine how behavioristic theory can be applied in this context to improve learning outcomes and support the achievement of national education goals. The theory of behavioristic learning was developed by scientists such as John B. Watson, Ivan P. Pavlov, Edward L. Thorndike, and B.F. Skinner has long been recognized in the world of education (Zhang, 2024). This theory emphasizes the observable and measurable aspects of learning, with a focus on stimulus-response interactions.

Problem of The Study

The 21st century with the advent and modernization of technology, culture, and a global outlook has become a challenge for teachers as educators. Teachers must present learning that suits students' needs so that it is useful for students in the future, referring to learning theories that are implemented and integrated appropriately in the classroom (Putri & Rusmini, 2021). Learning theory is an important thing that teachers must understand. Learning theories influence students' learning processes, so teachers must master theories about learning to be able to scientifically account for their teaching behavior/actions in front of the class (A.M.Irfan Taufan Asfar et al., 2019).

Research's State of the Art

From the past research, learning cannot be separated from the learning process which is essentially an invisible mental activity (Teo, 2019). The changes that occur in students who are learning cannot be witnessed using the senses but can be seen from symptoms of behavior change that can be measured (Kamau & Oematan, 2023). A learning theory that emphasizes changes in student behavior is behaviorist learning theory (Efgivia et al., 2021). Behavioristic learning theory focuses on understanding

human behavior objectively, mechanistically, and materialistly, allowing changes through conditioning efforts, rather than observing body activities (Ulya, 2023). This theory emphasizes the importance of observation in determining whether changes in behavior occur. So, based on the description above, the discussion regarding 21st-century behavioural learning in primary school must be studied in more depth.

Novelty, Research Gap, & Objective

The novelty of this research lies in its implementation of behaviorist learning theories in the context of modern primary education in Indonesia, addressing the current gap in practical implementation. While behaviorist theories like those of Pavlov, Skinner, Thorndike, and Watson are well-established, their integration into 21st-century learning environments remains underexplored. This research aims to bridge that gap by providing practical insights and strategies for educators to effectively apply behaviorist principles in their teaching, thereby enhancing student outcomes and aligning with the educational goals of Indonesia.

METHOD

Type and Design

This study used the Systematic Literature Review (SLR) method. SLR is a method to identify, evaluate, and interpret relevant research results related to a specific research question. The function of SLR data analysis is to synthesize and deepen relevant research results. The facts presented by the synthesis results will be beneficial for decision-makers (Carrera-Rivera et al., 2022). The data in this article was presented descriptively which showed a scientific study that could be developed and applied further. The object of writing the description in this article was about the implementation of behavioral learning in the 21st century.

Data and Data Source

The research on literature studies on building 21st-century skills through recent behavioral learning using data from 10 research such as reputable scientific journals Sinta or Scopus, and government publications that are relevant to the research topic.

Data Collection Technique

Data collection techniques were planned to determine the Research Question (QR), conducted to search strings from journals, and conference proceedings for data extractions and synthesis of evidence, and the last is reported to write SLR results. The Data Collection Technique is shown in **Figure 1.**
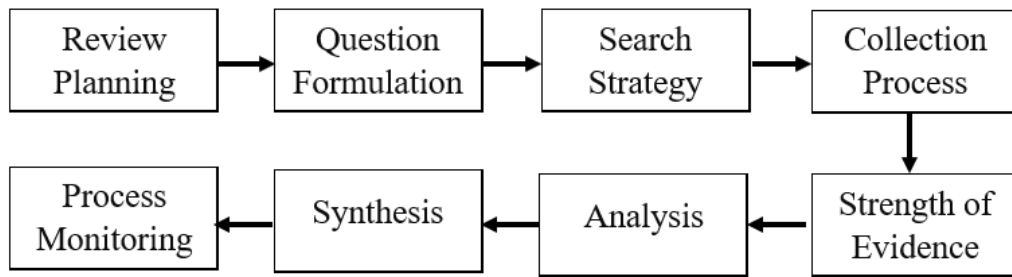
Figure 1. Data Processing Chart

Data Analysis

Researchers collected reputable journals Scopus or Sinta through the Google Scholar database with the help of the Publisher or Perish application. The article taken is an article with the publication year 2018-2014. The researcher selected 10 journals most relevant to the question "How to implement behavioristic theory in 21st-century learning". Furthermore, the researcher conducted a review and analysis that was more deeply related to the results and discussion of the article. In the last step, the researcher combines the findings with behavioristic theory and concludes.

RESULT

This study used a Systematic Literature Review (SLR) method. This study used 10 previous research related to the question "How to implement behavioristic theory in 21st-century learning" in reputable journals (Scopus and Sinta).

Table 1. Analysis Result

Study	Method	Result
Applying Behavioral Learning Theory in Schools (Sprague, 2024)	Library Research	Behavioral learning theory in schools employs reinforcement and punishment methods to teach new behaviors and address problematic ones, promoting effective academic and behavioral development.
Implications of behavioristic learning theory in primary school level student learning (Ulya, 2023)	Qualitative research methods (Natural Setting)	Behavioristic learning theory in schools emphasizes behavior change through stimuli and responses. Teachers play a crucial role by providing reinforcement and feedback to enhance student learning at the elementary level.
Implementation of Behavioristic Learning Theory in Learning Aqidah Akhlak in Ma Hidayatul Mubtadiin, Sidoharjo Village, Jati Agung District, South Lampung Regency Academic Year 2021/2022 (Anfasyah Et Al., 2022a)	Qualitative descriptive	The implementation of the Behavioristic learning theory in learning Aqidah Akhlak is that the teacher provides stimulus, greets when entering and leaving the class, prays before starting the lesson, motivates students, asks questions to students at the end of the lesson, and provides reinforcement.
Thorndike's Connectionism Theory: Application and Limitations in the Learning of Kiswahili as a Second Language(Kalabai, 2023)	Qualitative method	The connectionism theory has positive effects on learners of all ages. It has principles that motivate the learners.

"Do as I do, not as I say": Using social learning theory to unpack the impact of role models on students' outcomes in education (Ahn et al., 2020)	Qualitative method	The attentional, cognitive, and motivational processes of role models, as well as these same processes associated with role aspirants, provide a more comprehensive and integrated understanding of role models in education.
Analysis of Behavioristic Theory (Edward Thordinke) and Its Implementation in SD/MI Learning (Hermansyah, 2020)	Library research	Teachers could apply the four laws of Thordinke so that students can be maximally involved in learning so that goals can be achieved.
Implementation of Behavioristic Learning Theory in Mathematics Learning Class V SDN 13 Tilamuta (Amrain et al., 2022)	Qualitative descriptive methods	the implementation of behavioristic learning theory improved students' understanding of mathematics learning
Implementation of Behavioristic Learning Theory in the Online Learning Process at SMP PGRI Gandoang Class VII (Efgivia et al., 2021)	Qualitative method	Behavioristic learning theory focuses more on developing student behavior in a better direction.
Implementation of behavior approaches in learning to write short stories through literature engineering in IKIP Siliwangi (Sahmini & Priyanto, 2019)	Descriptive analytical methods	Motivation and habit of evaluating the process, achievement, and habit of giving positive values will make the culture of values respect each other, be responsible, increase motivation in writing, respect, and love each other also empathize.
Social Perspectives of Pedagogy: Moral Behavior of Learners in Primary Schools (Fitriyani et al., 2023a)	Qualitative approach with ethnographic methods.	The views of the social perspective of pedagogy influence the moral behavior and character of learners in elementary school.

Behavioristic Theory

Learning is an interaction between stimulus and response (Hartati & Panggabean, 2023). Learning involves input from a teacher and output from a student's response. Behavioristic theory observes stimulus and response processes, while the interaction between them isn't significant as it's unobservable (Sipayung & Sihotang, 2022). The behavioristic theory is based on behavior obtained from environmental conditioning (Mardiyani, 2022). Behavioristic theory is viewed systematically through observing stimuli and responses and does not consider the whole. In classroom implementation, behaviorist theory emphasizes the formation of behavior in the form of learning outcomes for students (Nahar, 2019). Learning theories according to experts are discussed as follows

A. John B. Watson (1878-1958)

John B. Watson was an American psychologist in the 1930s who argued that learning was a process of interaction between stimulus and response that must be observable and measurable. Therefore, Watson admitted that there were mental changes in himself during the learning process, but these factors could not be

observed, so they were not important to consider. Watson assumed that only paying attention to the stimulus and response could change it after someone carries out learning actions (Fahie & Dunne, 2021).

B. Ivan P. Pavlov (1849-1936)

Ivan P. Pavlov, a Russian scientist, developed behavioristic theory through experiments with dogs and their saliva. He combined food and light to induce salivation and only gave red light without food to maintain salivation. The red light was an artificial stimulus, while food was a genuine stimulus. It turned out that this artificial stimulation would cause the dog to drool if done repeatedly. Pavlov discovered this process because the original/neutral stimulus was combined with a reinforcing component that produced a reaction. The reinforcer was an unconditional stimulus or Unconditioned Stimulus (US), and a neutral stimulus was called a conditioned stimulus (CS). Natural reactions or reactions called conditional reactions or Conditioned Responses (CR) were not learned before. Pavlov used the word reinforcer for agents such as food, which reduced some of the needs. As a result, saliva (UR) would come out of the dog's mouth as a reaction to food (US). If a neutral stimulus, such as light (CS), was turned on at the same time as food's presented, salivation (CR) occurred. Classical conditioning, linked to the involuntary nervous system and muscles, was responsible for the formation of emotions (Laeli, 2020). The stimulus-response relationship model in behavioral theory views students as passive individuals, influenced by training methods or habituation, with behavior strength increasing with reinforcement and disappearing with punishment (Prasetyo, 2023).

C. Edward Lee Thorndike (1874-1949)

Edward Lee Thorndike defined learning as an event that forms associations between events called Stimulus (S) and Response (R). Stimulus is a change in the external environment that signals an organism to act or do something, while the response is behavior produced by a stimulus. Thorndike experimented by putting a hungry cat in a cage (puzzle box). Thorndike's connectionist learning theory, also known as association theory, emphasizes the importance of trial-and-error learning, which involves selecting and connecting stimuli based on specific laws (A.M. Irfan Taufan Asfar et al., 2019).

Thorndike placed the cat in a closed cage, and when the knob was touched, the door opened automatically. These experiments resulted in the theory of "trial and

error" or "selecting and connecting", stating that learning was based on trial and error. This experiment showed that the cat tended to abandon actions that had no results. Each response caused a new stimulus, then this new stimulus caused another response, and so on, so it could be described as follows:

$$S \rightarrow R \quad S1 \rightarrow R1 \quad S2 \rightarrow R2$$

When food was placed outside the cat's cage, the cat tried to get the food by jumping/touching there until it finally touched the knob accidentally which caused the cage door to open, and the cat ran to the food place. This experiment was carried out repeatedly, for example, ten to twelve times, before the cat touched the knob and ate its food outside the cage. After conducting experiments, Thorndike coined several laws: 1) The law of readiness, namely the more ready the creatures to obtain changes in behavior so that the implementation of the behavior would be led to satisfaction. So, the principle of the law of exercise was a connection between conditions. Stimulus with action would become stronger due to practice but weaken if the connection between them stopped. The principle showed that the main principle in learning was repetition. The more often you repeat, the better the material would be mastered; 2) The law of effect (consequence), namely that the stimulus-response relationship strengthens when the result is pleasant. Then, weakens if the result is unsatisfactory. This law stated that strong or weak connections were the result of actions. The connection between impressions (five senses) and the tendency to act could be strengthened or weakened, depending on the "fruit" of the actions that have been carried out.

Thorndike believed that the principles of the learning process in animals were the same as those that applied to humans. Although the relationship between situations and actions in animals was not mediated by meaning. Thorndike's theory views students as pieces of white paper, where recipients of knowledge are ready to receive knowledge passively. This view of learning had an impact on the view of teaching. Teaching was planning the sequence of arranging teaching materials, communicating them to students, and bringing them to practice using new concepts or procedures. New concepts and procedures would become more stable with lots of practice (trial and error). In principle, this theory emphasizes giving lots of practice to students so that they can master the concepts and procedures well.

D. Burrhus Frederic Skinner (1904-1990)

Skinner developed Thorndike's behaviouristic theory and its implementation was more flexible than Pavlov's Classical Conditioning. Skinner's behaviouristic theory was often called Operant Conditioning. Skinner experimented by placing a hungry rat in a box called a "Skinner box". Mice in a box accidentally touched a lever, causing food to come out. Over time, fewer mice engaged in observing activities and changed to pressing the lever for food, learning the relationship between the lever and food.

Operant conditioning involves conscious muscle use and repetition for reinforcement, influenced by environmental conditions and reinforcement. Strengthening repetition is crucial for consistent behavior or answer demonstration (Shahbana et al., 2020). Skinner posits that the interaction between stimuli and the environment leads to complex behavioral changes, as the stimuli interact with each other (Leão & de Carvalho Neto, 2019). Skinner's behaviouristic learning theory, based on the stimulus-response relationship model, suggests that students learn passively, with reinforcement leading to strong behaviors that disappear if punished (Almizri & S, 2022). So that when students were given stimulation, they would react and respond to the stimulus, and ultimately automatic learning habits were produced as a result of the stimulus-response relationship (Segers et al., 2021).

Skinner divided this reinforcement into two categories, namely positive reinforcement and negative reinforcement (Palmer, 2018). Positive reinforcement included rewards or rewards, while negative reinforcement included delaying or withholding rewards, giving extra tasks, or demonstrating unpleasant behavior. Some of the principles adhered to by Skinner are as follows: 1) Learning results must be immediately communicated to students, if they are wrong they will be corrected, or if they are correct they will be reinforced; 2) The learning process must follow the teacher's learning rhythm; 3) Punishment should not be used during the learning process, so the environment should be changed to avoid punishment; and 4) The behavior desired by the teacher must be rewarded and reinforced according to that behavior.

DISCUSSION

Implementation of Behaviouristic Learning Theory in Teaching Learning Process

Behaviorist theory views learning as the result of stimulus-response, where the teacher's role is to control the environment and use a system of rewards/punishments to shape student behavior (Miftahul Ulum & Ahmad Fauzi, 2023). Teachers must provide stimulation (stimulus) to students in learning so that students could respond positively which was also supported by reinforcing responses in the form of rewards/punishments (Sipayung & Sihotang, 2022). In applying behaviorist theory in 21st-century basic education classes, teachers must understand well the behavior expected from the stimulus, teachers could divide actions into several stages starting from simple to complex, teachers involve students in learning and provide feedback, and teachers facilitate the learning process by providing random reinforcement to achieve learning goals and maintained student performance (Johnson, 2015).

Behaviouristic theory was the key to understanding how to motivate and help students achieve learning goals appropriately (Fitriyani et al., 2023b). Learning material is transferred from teacher to student using stimuli and producing responses that are carried out repeatedly so that students remember the teacher's intentions coherently(Ismail & Arnawa, 2019). In this case, positive reinforcement was the key in behaviouristic learning theory because without positive reinforcement students would easily forget the teacher's intentions (Rochmawati, Annisa, Wiyanto, dan Ridlo, 2020). Repetition and positive reinforcement must go hand in hand in implementing behaviouristic theory in the classroom (Mokalu et al., 2022). Apart from that, motivation also played an important role in behaviouristic learning where positive and negative reinforcement could be a motivator for students (Khotimah et al., 2023). For example, if student A received praise for getting a test score of 100, it was likely that this student would be even more motivated to get a score of 100 in the next test. Teachers could implement elementary school behaviouristic learning in various strategies/techniques in the classroom such as 1) Drill, teachers could invite students to practice certain material questions repeatedly to strengthen the desired behavior; 2) Two-way learning/question and answer, the teacher could provide stimulus in the form of questions and participants provide answers (responses); 3) Direct Instruction (DI), teachers could use the DI learning model to guide students through problems in stages; and 4) Feedback, the teacher provided important reviews in the form of

reinforcement or repetition of important material to help students remember the information better (Ernata, 2017; Suriyani, 2020).

In implementing behaviorist learning theory in basic education, teachers must analyze the initial abilities and characteristics of students so that the learning provided follows students' needs (Santika et al., 2023). Initial ability analysis functions so that teachers obtain an overview of students' initial abilities which could be used as a reference in preparing appropriate learning and assessments so that students could adapt to the material that would be provided by the teacher who gives tests and groupings (tests were carried out before students take part in learning) and from the results of the analysis of student's initial abilities, teachers could divide them into two categories, namely students who had mastered it and students who had not mastered the material (Amalia et al., 2023; Mulyawati et al., 2022). Teachers could also apply peer tutoring between students who have mastered and who have not mastered the material during the shaping treatment. Behavioral theory in elementary education classrooms could provide a clear and objective way to evaluate student progress, where teachers could easily adapt teaching and feedback according to student needs and abilities. In applying behaviouristic theory, teachers could manage actions/behavior in the classroom by using positive and negative reinforcement strategies that were able to motivate students to learn by rewarding them for their achievements and efforts (Arianti, 2022). Thus, it could be understood that the application of behaviorist learning theory was concerned with the influence of the environment. The formation of learning outcomes was based on the reactions shown by students which were expected to cause students to carry out learning sustainably (Berlian et al., 2021).

The implementation of behavioristic theory can be used in religious lessons in elementary schools on "Aqidah and Akhlaq". Because the learning of Aqidah and Akhlaq is a conscious effort so that students can know, understand, live, and believe in Allah SWT so that they can apply good moral behavior, through guidance, teaching, training, utilizing experience, environment, example, and habituation (Anfasyah et al., 2022). The implementation of behavioristic learning theory in learning faith and morals is the application of Ivan Pavlov's theory (Classical Conditioning) teachers habituate by saying greetings when entering class, asking students to pray before learning, and motivating students for more enthusiastic in learning. The application of B.F Skinner's theory (Operant Conditioning), teachers provide positive reinforcement in the form of the words " Good job, Mumtaz" accompanied by applause

and negative reinforcement in the form of reprimands and punishments (standing in front of the class and answering questions from the teacher). In addition, the theory of Throndike (Connectionism) applies methods of discussion, practice, and solving problems such as inviting students to practice courtesy walking in Islam so that students can grasp the concepts and procedures they master well (Sikolia Cleophas Kalabai, 2024). As well as John B. Waston's theory (social learning) teachers can be role models by coming not late, speaking well, and wearing neat and polite clothes (Ahn et al., 2020).

The implementation of behavioristic theory is also applied in mathematics learning in phase B, namely the application of theory from Edward Lee Thorndike (trial and error learning) using the Inquiri method (Hermansyah, 2020a). The teacher can give some pictures of the room and show them to the students. By looking at the student room building pictures, students will connect these images systematically to build a new space like a house, a combination of building square and triangular spaces. When the student fails to combine one room with another to build a new space, the student will try to take another room, so that the student's fine motor will be trained and this phenomenon is in line with Thorndike's theory, namely trial and error. In this way, students can discover new things that result from combining images through a process of trial and error until finding a suitable space. This can sharpen students' brains to think about finding something new from an image (Hermansyah, 2020b). The steps for implementing learning using the inquiry method are as follows: a) the preparation stage; Initial assessment, determining learning objectives, preparing a comfortable learning place, teaching materials, and media that can be used to support student motivation. b) the stage of implementation; Teachers form groups of 4-5 students. The teacher observes the activeness, seriousness, interest, perseverance, and cooperation of students in groups in solving problems. The teacher evaluates the difficulties experienced by students and conducts learning variations so that different responses will arise to improve and perfect skills or language skills, both speaking, writing, listening, and reading skills (Hermansyah, 2020b). The application of behavioristic theory in increasing student understanding of mathematics learning can improve students to think critically, reason, argue, contribute to solving various problems, creative and active so that there are behavioral, cognitive, and psychomotor changes in students (Amrain et al., 2022).

This study explores the application of behavioristic learning theory in Indonesian basic education, aiming to improve student learning outcomes and align

with educational goals. It provides practical insights and strategies for educators to use reward and punishment schemes to shape student behavior. The research encourages teacher involvement, constructive criticism, and support, ultimately supporting Indonesia's national education goals and sustainable development towards a Golden Indonesia 2045.

CONCLUSION

The findings of the study show that the application of behavioristic learning theory in the classroom requires the regulation of the classroom environment by teachers and the use of a punishment system to shape student behavior. Teachers must be actively involved in the learning process, provide constructive criticism, support peer guidance, and conduct an initial analysis of students' ability to design appropriate learning plans. Teachers can use these strategies to create a conducive learning environment and motivate students through positive reinforcement and constructive feedback.

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