

PERCEPTIONS OF THE USE OF *THE BLACK BOX.AI* DIGITAL PLATFORM AS A LEARNING MEDIUM IN THE DIGITAL AGE AMONGST STUDENTS OF THE FACULTY OF ENGINEERING, ABDURRAB UNIVERSITY, COHORT OF 2022

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ABSTRACT

In this study, perception is defined as an individual's cognitive process of receiving, organising and interpreting information. This research aims to explore the perceptions of 2,022 students from the Faculty of Engineering at Universitas Abdurrab regarding the use of the digital platform Black Box.ai as a learning medium in the digital age. The study employed a descriptive qualitative approach based on Robert J. Sternberg's theory of perception, which encompasses sensation, perception, recognition, top-down processing and bottom-up processing. The research informants comprised six students from the Faculty of Engineering at Universitas Abdurrab, class of 2022, who had experience using Black Box.ai in their learning activities. Data were collected through in-depth interviews, observation and documentation. The data were analysed using the Miles and Huberman model, which comprises data reduction, data display, drawing conclusions, and verification. The findings indicate that students generally hold positive perceptions of the use of Black Box.ai as a digital learning medium. The platform is considered user-friendly, with a simple interface and navigation system, and is helpful in searching for, understanding, and processing course materials, particularly those that are technical and complex. The available features are perceived to improve learning efficiency, speed up information retrieval, and enhance students' understanding of learning materials compared to conventional learning methods. Based on Sternberg's theory of perception, students' prior learning experiences, knowledge, and academic needs influence how they evaluate the benefits and effectiveness of the platform. Nevertheless, students emphasised that lecturers continue to play a vital role in providing explanations, clarification, and reinforcement of learning materials. Overall, Black Box.ai is perceived as having significant potential to support the quality of learning in the future when used wisely and integrated with the role of educators.

Keywords: Student perceptions, Black Box.ai, digital learning resources.

I. INTRODUCTION

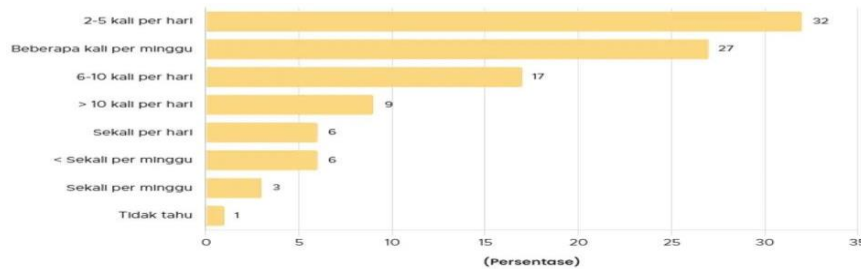
Developments in information and communication technology have driven a transformation in the world of education, particularly through the use of *Artificial Intelligence* (AI) as a learning tool. AI not only serves as a tool for searching for information, but is also capable of helping students understand subject matter, complete assignments, and enhance the effectiveness of the learning process. One AI platform currently in widespread use is *Blackbox.ai*, an artificial intelligence-based application that provides services ranging from information retrieval and code generation to concept explanations and the rapid resolution of various academic problems. The use of this technology demonstrates that the learning process in higher education is increasingly shifting towards a more adaptive and interactive form of digital learning.

Within the university environment, particularly amongst students in the Faculty of Engineering, *Blackbox.ai* has become one of the most frequently used platforms to help understand course material, find references, and complete academic assignments. The ease of access, the speed at which information is obtained, and the platform's ability to provide solutions to various academic problems make *Blackbox.ai* a viable alternative learning tool. However, behind these conveniences, the use of AI also presents challenges, such as the potential for user dependency, a decline in critical thinking skills, and the possibility of inaccurate information arising if verification processes are not carried out. Therefore, students' perceptions of the use of *Blackbox.ai* are an important aspect to examine as a basis for understanding how AI technology can be utilised effectively in the learning process.

Several previous studies have shown that the use of Artificial Intelligence in learning has a positive impact on students' learning activities. A study at UIN Sultan Syarif Kasim Riau examined students' experiences of using an AI platform as a learning medium, employing a phenomenological approach. Another study by Intan Azkiyatul Aulia (2025) investigated the effect of using *Blackbox.ai* on students' learning motivation, using a quantitative approach. Meanwhile, Ahmad Fauzi (2022) examined the effectiveness of the Coursera platform as an online learning medium. However, these studies have not specifically addressed students' perceptions of the use of *Blackbox.ai* as a learning medium based on Robert J. Sternberg's perception indicators, particularly amongst students at the Faculty of Engineering, Abdurrah University.

In light of this, this study aims to analyse the perceptions of students in the Faculty of Engineering at Abdurrah University, cohort of 2022, regarding the use of the *Blackbox.ai* digital platform as a learning medium in the digital age. This study utilises Robert J. Sternberg's theory of perception—which encompasses *sensation*, *perception*, *recognition*, *top-down processing* and *bottom-up processing*—as a framework for understanding how students receive, process, recognise and assign meaning to their experiences of using *Blackbox.ai*. The findings of this study are expected to contribute to the development of the prudent, effective and responsible use of Artificial Intelligence in supporting the learning process at higher education institutions.

Figure 1.
Figure: How Often Do Students Use AI



Source: Data.goodstats.id. Statistical data 2024

Over-reliance on *Artificial Intelligence (AI)* in learning can have several negative consequences for students. One of these is dependence on AI, whereby students tend to rely on AI to complete assignments or find answers, which can diminish their critical thinking and problem-solving skills. Furthermore, excessive use of AI can also prevent students from gaining a deeper understanding of the subject matter, as they are quicker to accept instant answers than to process information in depth. The risk of inaccurate or biased information also increases, given that AI does not always provide the correct answers.

Another impact is a reduction in creativity, as students rely more on AI to generate ideas or content, thereby limiting their ability to think independently. Over-reliance on AI can also disrupt time management, as students may spend excessive time experimenting with various AI features whilst neglecting independent study or interaction with peers. Finally, social and ethical aspects are also affected, as direct interaction with lecturers or peers decreases, and reliance on AI has the potential to lead to issues of plagiarism or breaches of academic ethics. Therefore, whilst AI can assist the learning process, its use still needs to be regulated so that these negative impacts can be minimised.

Advances in science and technology have already improved education. Particularly for those in the education sector—such as students, teachers and school administrators—when it comes to access to learning materials. The internet, which has been introduced as the sole electronic medium, has completely transformed the way we learn and teach. (Hidayati 2022, p. 42).

II. THEORETICAL REVIEW

A. Perception

Perception is a cognitive process undertaken by an individual to receive, organise, recognise and interpret information obtained through the five senses, thereby producing an understanding of an object or event. According to Sternberg (1997), perception is a series of processes that enable a person to recognise, organise, and understand sensory information received from the environment. Thus, perception is influenced not only by the stimuli received but also by an individual's experience, knowledge, and thought processes.

In this study, Robert J. Sternberg's theory of perception was used as the basis for analysing how students view the use of Blackbox.ai as a learning medium. Sternberg identified five key indicators in the perceptual process, namely *sensation*, *perception*, *recognition*, *top-down processing*, and *bottom-up processing*. *Sensation* is the initial process whereby an individual receives stimuli through the senses. *Perception* is the process of organising information so that it acquires meaning. *Recognition* is the ability to identify information based on prior experience

Furthermore, *top-down processing* indicates that perception is influenced by an individual's knowledge, experience and expectations, whilst *bottom-up processing* is the process of understanding information based on stimuli received directly. These five indicators are used to determine how students receive, understand and evaluate the use of Blackbox.ai in supporting the learning process.

Etymologically, the term 'perception' derives from the Latin 'perceptio', from 'percipere', meaning to receive or take in. According to Rahmat, perception is an experience of objects, events, or relationships obtained by synthesising information, interpreting messages, and attributing meaning to sensory stimuli.

Communication perception is influenced by various factors, both internal and external. Internal factors include an individual's experience, motivation, emotions, values and beliefs, whilst external factors encompass the characteristics of the message, the context of communication, the medium used, and the social and cultural situation (Rakhmat, 2012; Devito, 2011).

In the context of digital communication, technological factors also play a significant role, such as interface design, ease of use, and the accuracy of artificial intelligence (AI)-based systems. Consequently, communication perception theory can be used to explain how students interpret their experiences of using digital platforms such as Blackbox.AI as a learning medium. Through this theory, it can be understood why students' perceptions of the use of AI-based learning technology may differ, depending on their experiences, understanding, and beliefs regarding the effectiveness of such media in supporting the learning process in the digital age.

Meanwhile, according to DeVito (2016:62), perception is the process by which a person becomes aware of various objects or events—particularly other people—as perceived through the five senses: sight, smell, taste, hearing and touch. Interpersonal perception is a series of continuous processes that are interlinked. According to DeVito (2016:64), the process of interpersonal perception takes place through five stages, namely stimulation, organisation, interpretation and evaluation, memory, and recall.

1. Stimulation

The first stage of the interpersonal perception process is when the senses are stimulated by various pieces of information originating from the surrounding environment. It is important to understand that not everything from our surroundings can be perceived. This is due to selective attention and selective exposure. In selective attention, we tend to focus only on certain things that we consider important. Meanwhile, in selective exposure, we tend to expose ourselves to people or messages that will reinforce our beliefs or contribute to our established goals

2. Organisation

In the second stage of the interpersonal perception process, we organise the various pieces of information obtained. There are several methods commonly used by humans to organise the information obtained, namely through rules, through schemata, and through scripts.

3. Interpretation and evaluation

The interpretation and evaluation stage in interpersonal perception is influenced by experience, needs, desires, values, and beliefs about how things ought to be, expectations, physical and emotional expressions, and so on. The interpretations and evaluations we make are also influenced by the rules, schemata, and scripts we possess. For example, women are regarded as being more positive in their assessment of others when compared to men.

4. Memory

Our own perceptions, as well as the interpretations and evaluations of others, are subsequently stored in memory. All information is stored in memory and can be retrieved at a later time. The processes or mechanisms of memory are explained in greater detail in one of the theories of intrapersonal communication, namely the information-processing theory. This is because memory forms part of the information-processing process, which in communication psychology is referred to as intrapersonal communication

5. Retrieval

The recall stage refers to the process of accessing and using information stored in memory. This recall may be consistent with a schema, inconsistent with a schema, or even completely different from a schema. For example, when answering an essay question in an exam, we will try to recall facts stored in our memory.

B. Artificial Intelligence and Blackbox.ai as Learning Tools

Artificial Intelligence (AI) is a technology designed to mimic human cognitive abilities in processing information, solving problems, and making decisions automatically. According to Russell and Norvig (2016), AI is an intelligent system capable of receiving information from the environment, processing that information, and then generating actions or decisions in line with specific objectives. In the world of education, AI is utilised to enhance the effectiveness of learning by providing material that is more adaptive, personalised and easily accessible to users.

One of the AI platforms widely used in academic activities is *Blackbox.ai*. This platform offers a range of features that can help students find references, understand course concepts, write programme code, and obtain explanations of various academic materials. Blackbox.ai makes it easy to access information quickly, thereby improving the efficiency of the learning process. However, using this platform still requires critical thinking and verification of the information obtained to avoid dependency or errors in the use of academic information.

According to Jaya et al. (2019), when thinking about AI, one should consider the interaction between goal-seeking, the data processing used to achieve those goals, and the acquisition of data used to better understand the goals. AI relies on algorithms to achieve results that may or may not be related to human goals or the methods used to achieve them.

One of Blackbox.ai's key features is its ability to convert natural language descriptions into functional code. Users simply explain what they want in simple sentences, and the application will translate these requests into code in various programming languages. This feature not only speeds up the learning process but also helps users understand how their ideas can be realised in the form of code. Blackbox.ai is an example of an Artificial Intelligence (AI)-based learning application designed to improve the quality of learning. This application uses AI technology to understand students' behaviour and needs, thereby providing a more personalised and effective learning experience.

In addition, Blackbox.ai also supports collaborative learning. This app enables pupils to interact and collaborate on projects or tasks, which can enhance their social and communication skills. This means that Blackbox.ai helps to create a more dynamic and interactive learning environment, where pupils can learn from one another. However, it is important to consider the ethical aspects of using this app. Specifically, the collection of pupil data must be carried out transparently and with clear consent to protect privacy and the security of personal information. Furthermore, app developers must ensure that the algorithms used provide equal opportunities for all students, regardless of their background or abilities. This means that AI-based learning apps offer a range of significant benefits within the field of education. However, we must also remain mindful of the challenges and ethical issues that arise to ensure that this technology is used in a way that benefits all parties involved.

According to Elaine Rich and Kevin Knight, as cited in Subiyantoro (2024), AI is studied as an effort to bridge the gap between the capabilities of machines and humans in performing specific tasks, such as playing chess, translating languages, or recognising faces.

Meanwhile, according to Russell & Norvig (2016), AI is the study of intelligent agents that perceive their environment and take action. As artificial intelligence develops, it is also making inroads into the world of education. Artificial intelligence systems enable humans to learn with the assistance of aids such as robots. Current developments require the world of education to adapt to technological advancements in order to improve the quality of education, particularly by adapting information and communication technology.

Based on the above, this study utilises Robert J. Sternberg's theory of perception to analyse how students at the Faculty of Engineering, Abdurrah University, interpret the use of Blackbox.ai as a learning medium in the digital age. The perceptions formed through experience of using this platform serve as the basis for understanding the level of acceptance, benefits, and challenges of using artificial intelligence in the learning process at university level.

III. RESEARCH METHODOLOGY

This study employs a qualitative approach using descriptive methods to describe the perceptions of students in the Faculty of Engineering at Abdurrah University, cohort of 2022, regarding the use of the *Blackbox.ai* digital platform as a learning medium in the digital age. This approach was chosen as it provides an in-depth understanding of the informants' experiences, views and assessments regarding the use of Artificial Intelligence in the learning process.

Research participants were selected using *purposive sampling*, namely students from the Faculty of Engineering at Abdurrah University, intake year 2022, who actively use Blackbox.ai in their academic activities. The study involved six participants who met these criteria, thereby enabling them to provide information relevant to the research objectives.

Data collection techniques comprised *in-depth interviews, observation and documentation*. Interviews were used to gather information regarding the students' experiences and perceptions of using Blackbox.ai, whilst observations were carried out to monitor the platform's utilisation in learning activities. Documentation was used as supporting data in the form of documents, photographs and archives relevant to the research.

Data analysis was conducted using the model proposed by Miles, Huberman and Saldaña (2014), which comprises three stages: data reduction, data presentation, and drawing conclusions or verification. The validity of the data was tested using source triangulation, which involves comparing the results of interviews with different informants against the results of observations and documentation, thereby ensuring that the data obtained is valid and reliable.

The analysis of students' perceptions was conducted based on Robert J. Sternberg's (1997) theory of perception, which comprises five indicators: *sensation*, *perception*, *recognition*, *top-down processing*, and *bottom-up processing*. These five indicators were used as a framework for analysing how students receive, understand, recognise, and assign meaning to the use of Blackbox.ai as a learning medium in the digital age.

To ensure the validity of the data, this study employed source triangulation, which involves comparing information obtained from various informants with the results of observations and documentation. This technique was employed to enhance the credibility of the data so that the research findings could be scientifically justified. All data were subsequently analysed using Robert J. Sternberg's theory of perception, which comprises five indicators—namely *sensation*, *perception*, *recognition*, *top-down processing* and *bottom-up processing*—as the basis for interpreting students' perceptions of the use of Blackbox.ai as a learning medium in the digital age.

IV. RESULTS AND DISCUSSION

This study involved six students from the Faculty of Engineering at Abdurrah University, cohort of 2022, who actively use the *Blackbox.ai* platform in their academic activities. Based on the results of in-depth interviews, observations and documentation, it was found that the students tended to have a positive perception of the use of Blackbox.ai as a learning medium in the digital age. These perceptions were analysed using Robert J. Sternberg's theory of perception, which comprises five indicators: *sensation*, *perception*, *recognition*, *top-down processing* and *bottom-up processing*.

Regarding the *sensation* indicator, students expressed a positive initial impression of Blackbox.ai. The platform was assessed as having a simple interface, being easy to operate, and capable of presenting information quickly, thereby facilitating students' ability to search for references or complete coursework. This ease of use encouraged students to utilise Blackbox.ai as a supporting tool in their learning process.

Next, regarding the '*perception*' indicator, students began to interpret their experiences whilst using Blackbox.ai. The majority of respondents felt that the platform helped them understand difficult subject matter, particularly topics related to programming, calculations, and technical concepts. As well as speeding up the search for information, Blackbox.ai is also considered to improve learning efficiency, as students can obtain explanations directly without having to search through various separate sources. These findings indicate that students view Blackbox.ai as a practical and effective learning tool to support their academic activities.

In terms of the '*recognition*' indicator, students have been able to recognise the functions and benefits of Blackbox.ai as an Artificial Intelligence-based learning platform. The informants understood that this platform is not only used to answer questions, but also to help organise ideas, correct mistakes, explain material and provide additional references for completing assignments. Thus, Blackbox.ai is perceived as a learning aid capable of supporting a better understanding of course material, particularly in technical subjects.

Meanwhile, regarding the *top-down processing* indicator, students' perceptions are influenced by their prior learning experiences and existing knowledge. Students who are already accustomed to using digital technology find it easier to accept Blackbox.ai as a learning tool. Positive experiences whilst using the platform have fostered a belief that Artificial Intelligence can enhance the effectiveness of learning. Nevertheless, all informants emphasised that the use of Blackbox.ai cannot replace the role of the lecturer. Explanations, guidance and clarification from lecturers remain essential to ensure students gain a deeper understanding and are able to verify the accuracy of the information provided by the AI system.

Regarding the '*bottom-up processing*' indicator, students' perceptions are formed based on information received directly whilst using Blackbox.ai. The ease of obtaining answers, the speed of accessing information, and the quality of the explanations provided contribute to a positive learning experience. However, students also recognise that the results provided by Blackbox.ai are not always entirely accurate and therefore need to be cross-checked against textbooks, academic journals, or lecturers' explanations. This awareness indicates that students do not rely on Blackbox.ai absolutely, but rather use it as a supporting tool that still requires verification of the information obtained.

Overall, the research findings indicate that students at the Faculty of Engineering, Abdurrah University, have a positive perception of the use of Blackbox.ai as a learning tool in the digital age. These findings are consistent with Robert J. Sternberg's theory of perception, which explains that perception is formed through the processes of stimulus reception, information organisation and meaning-making, and is influenced by an individual's experience and knowledge. Furthermore, the results of this study also support the research by Dwi Puja Syaharani (2024), which states that Artificial Intelligence platforms are capable of enhancing the effectiveness of learning and facilitating access to information. However, this study found that students not only recognised the benefits of Blackbox.ai but also understood the importance of using Artificial Intelligence wisely, whilst maintaining the lecturer's role as a facilitator, mentor and source of clarification within the learning process. Consequently, Blackbox.ai is regarded as an effective learning tool when used proportionately and integrated with conventional learning processes.

V. CONCLUSION

Based on the research findings, it can be concluded that students of the Faculty of Engineering at Abdurrah University, cohort of 2022, hold a positive perception of the use of the Blackbox.ai digital platform as a learning tool in the digital age. According to Robert J. Sternberg's theory of perception, this perception is formed through five indicators: *sensation*, *perception*, *recognition*, *top-down processing*, and *bottom-up processing*. Students assessed that Blackbox.ai has a user-friendly interface, is able to provide information quickly, helps them understand course material, facilitates the search for references, and improves efficiency in completing academic assignments. Their experience of using this platform has shaped their perception that Artificial Intelligence can serve as a learning medium that supports the learning process when utilised appropriately.

The research findings also indicate that learning experiences, prior knowledge and

academic needs are factors influencing students' acceptance of the use of Blackbox.ai. The ease of accessing information and the platform's ability to provide explanations of various topics make it easier for students to understand the concepts being studied. However, students recognise that information generated by Artificial Intelligence is not always entirely accurate and therefore still requires verification through textbooks, scientific journals, or explanations from lecturers. Consequently, the use of Blackbox.ai does not replace the role of lecturers but serves as a supplementary learning tool that helps improve the quality of the learning process.

This study suggests that the utilisation of Artificial Intelligence technology, particularly Blackbox.ai, can serve as an effective alternative learning tool to support higher education. Consequently, AI must be utilised wisely, responsibly, and in accordance with academic ethics so that the technology can enhance students' learning abilities without compromising their critical thinking skills, creativity, or independence in resolving academic problems. It is hoped that the findings of this study will provide input for higher education institutions in optimising the use of Artificial Intelligence technology as part of learning innovation in the digital age.

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