



Neuroscience Approach in The Industrial Revolution 4.0

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ABSTRACT

Industrial revolution 4.0 is related to the rapid progress of technology in the world. In short, the industrial revolution 4.0 is a digital transformation. In the face of the era of industrial revolution 4.0 as it is today, a neuroscience approach to the practical management of education is needed. The application of neuroscience can form synergy and engagement with high added value. This study provides an overview of the role of neuroscience approaches in the era of industrial revolution 4.0. The research method used in this study is a literature study. Based on the results of the research study shows that the neuroscience approach can maximize the theatre of the student's brain, which consists of emotional, social, cognitive, physical, and reflection aspects.

Keywords : neuroscience approach, industrial revolution 4.0

INTRODUCTION

Industrial revolution 4.0 is a general term used for the level of technological development in the world. In the industrial revolution 4.0 is more focused on technology that is digital. In general, industrial revolution 4.0 illustrates the burgeoning trend toward data exchange in technology and processes in the manufacturing industry. Industrial revolution 4.0 is about digital transformation. The existence of industrial technology 4.0, hence the need for a neuroscience approach.

Neuroscience is the study of the nervous system, which encompasses the basis of biological awareness, perception, memory, and learning. Neuroscience links cognitive behavior to actual physical processes that support behavior (Oktar, 2006). The main goal of neuroscience is to study the biological foundations of behavior. This means that the task of neuroscience is to explain human behavior from the point of view of activities that

occur in the brain (Wijaya, 2018). This is in line with Wathon (2016) who states the purpose of neuroscience is to study the biological basics of every behavior. This is the main task of this science is to explain human behavior from the point of view activities that occur in the brain.

Recent discoveries in neuroscience prove that certain parts of the brain can be responsible for organizing certain types of human intelligence. Mathematical intelligence and language are centered in the left brain, although for mathematics it is firmly centralized in the left brain. Musical and spatial intelligence centers on the right brain. Kinesthetic intelligence as possessed by the forehead is centered in the motoric cortex region of cerebri. Intrapersonal and interpersonal intelligence is organized in the limbic system and is connected to the prefrontal and temporal lobes.

Based on the previous description revolution industry 4.0 requires us to be able to understand the exchange of data in technology and processes in the manufacturing industry that is currently

happening. To overcome this problems, a neuroscience approach is needed. The neuroscience approach is expected to be able to control information technology in the era of the industrial revolution 4.0. Where the characteristics of the industrial revolution 4.0 are based on the lives of people who focus on information technology. The principle is that between neuroscience and the industrial revolution 4.0 must be in sync so that existing digital and virtual systems can bring the world of work in running school organizations. This is in line with the results of research conducted by Ahmad (2019) which states that learning with the neuroscience approach in technology 4.0, can change students into quality learners.

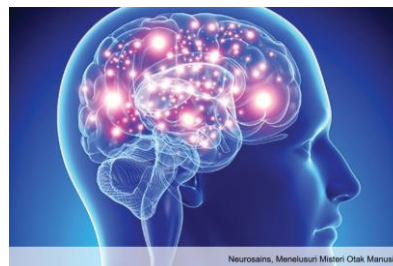
METHODS

This article is a form of qualitative research with the method used is a literature study, a research method that is done without going into the field and meeting respondents in person. This study used sources that originated from 15 scientific journals and 2 books.

RESULT AND DISCUSSION

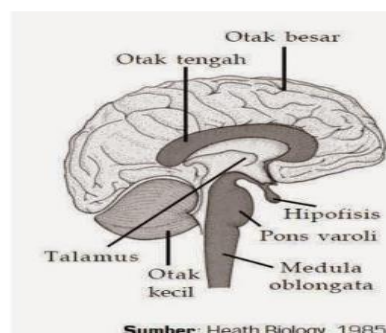
Definition of Neuroscience

Etymological neuroscience is a neural science that studies the nervous system, especially studying neurons or nerve cells with a multidisciplinary approach. Terminology is a field of science that specializes in the scientific study of the nervous system. Neuroscience is also referred to as the science that studies the brain and all other nerve functions. In neuroscience theory, the neural system and brain are the physical basis for human learning (Schneider, 2011)



Picture 1. Neuroscience and The Human Brain
Source: www.surya.ac.id

Neuroscience is the scientific study of the nervous system, problems with the nervous system and control of nerve function (Asfiati, 2019). Neuroscience is the study of the brain and mind. Brain-related studies are grounded in understanding how to feel and interact with the world, particularly about those experienced by humans and about the way humans influence others (Schneider, 2011). Neuroscience is able to make connections between cognitive processes that exist in the brain and the behavior that will be produced. This means that every command processed by the brain activates important areas of the brain (Harun, 2012)



Picture 2. Human Brain Parts

Important areas of the brain include the brain stem and cerebral hemispheres. The brain stem is divided into the back brain, midbrain, and diencephalon (British Neuroscience Association European Dana Alliance for the Brain, 2003). Diencephalon is divided into two distinct areas: the thalamus and the hypothalamus. The thalamus plays a role in relaying impulses from the sensory system to the cerebral cortex, then sending the message back to the thalamus. Hypothalamus functions in

controlling food, drink and the release of hormones involved in sexual function.

Application of Neuroscience Approach

Cognitive and affective neuroscience is a discipline that enhances neuroscience in understanding cognitive processes, such as: memory, language, attention, and consciousness; affective processes, such as: emotion, empathy, and motivation (Schenk et al., 2021). The human nervous system extends beyond the brain. Research conducted by Grimshaw GM (2021) shows that activity in the autonomic and somatic nervous systems can be used to answer questions about social and emotional processes.

In addition, the application of neuroscience approaches in learning can facilitate teachers in strategizing to teach students and increase HOTS in teachers, so that it will bring direct changes to the learning problems faced (Rivalina, 2020). This is supported by the results of research conducted by Sesmiarni (2014) that learning how the teacher's brain works can facilitate students by maximizing the theatre of the student's brain. Theatre consists of emotional, social, cognitive, physical, and reflection learning. Learning with this learning model strongly emphasizes the role of emotions in learning. One of the learning models that can be applied with a neuroscience approach is PBL (Problem Based Learning). This is in line with the results of Juliyanto et al (2021) research which states that the effectiveness of problem-solving skills is characterized by minimal brain activity and in solving complex problems, brain activity is focused on certain parts of the brain to achieve an effective thought process. This is in line with the opinion of (Resti, 2013) which states that the mechanism of action of the brain is related to learning skills that are influenced by the delivery of impulses in the form of information through the use of technology in the application of blended

learning that is able to present a stimulus in the form of real problems in the environment of students (Resti, 2013)

CONCLUSION

Learning with a neuroscience approach can maximize the theatre of the student's brain, which consists of emotional, social, cognitive, physical, and reflection aspects.

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