



The Role of Biology Education in Efforts to Revitalize Human Intelligence in the Era of Disruption: A Human Nature Perspective

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Abstract

The impact of technological domination can threaten the balance of human natural intelligence. The aim of this research is to analyze how biology education can be a solution in overcoming these challenges. The research method used involved an in-depth literature review of the concepts of natural intelligence, human nature, and the impact of technology on both. In addition, field research was conducted to analyze the effectiveness of biology education strategies implemented in several educational institutions. The research results show that biology education, critical thinking skills, and connection with nature can make a significant contribution to revitalizing human intelligence. The integration of biological concepts allows individuals to stay connected and offset the negative effects of technology. Thus, biology education has a crucial role in maintaining human natural intelligence in an era of disruption.

Keywords: *Biology Education, Human Natural Intelligence, Technological Disruption.*

INTRODUCTION

Technology is increasingly rampant in everyday life. Its presence raises questions regarding the influence of technology on human natural intelligence. Technological advances, especially artificial intelligence (AI) and digitalization, have made a major contribution to human progress, but have also posed new challenges to the nature of human intelligence. In this context, biology education offers the potential to revitalize human intelligence in overcoming the impact of the era of disruption.

With the emergence of artificial intelligence (AI) and technology that penetrates various aspects of human life, it is necessary to consider how this affects humans' natural intelligence and balance with their nature. This research aims to explore the role of biology education in revitalizing natural human intelligence in an era of disruption. This research offers a biology education strategy that emphasizes a deep understanding of human nature, promoting a balance between technological progress and natural human intelligence. Integration of biological concepts about the relationship between humans and nature, critical thinking skills, and practices that encourage natural intelligence. In this way, biology education will become the foundation for revitalizing human nature in an era of disruption.

There is a shift in human paradigm in facing rapid technological changes. Human natural intelligence, which includes connection with nature, critical thinking skills, and empathy, has been threatened by the dominance of technology which tends to lead to artificial intelligence centered on computing. This has resulted in concerns about humans' ability to maintain their identity and natural intelligence. This can even kill human expertise.

An effective biology education strategy can be the answer to efforts to revitalize human intelligence in an era of disruption. Thus, it is hoped that this research can contribute to the development of biology education that is relevant to the needs of the times, as well as a balance between technology and natural intelligence. The research problem focuses on how biology education can influence natural human intelligence, with the integration of the concept of human nature, critical thinking skills, and practices that support natural intelligence. Researchers found that in-depth biology education about human nature will make a positive contribution to efforts to revitalize human natural intelligence in an era of disruption.

In the midst of an increasingly unstoppable flow of technological innovation, the sustainability of human intelligence is a major concern. Natural intelligence, which includes aspects such as connection with nature, empathy, and critical thinking skills, is crucial for maintaining balance and quality of human life. Therefore, this research seeks to explore how biology education can be a solution in facing these challenges.

This article offers unique and important contributions compared to previous research in two main aspects. The focus of this research specifically links the role of biology education with revitalizing natural human intelligence in an era of disruption. Meanwhile, previous research tends to be fragmented and has not fully explored this relationship. By understanding human nature, this research offers a holistic concept in revitalizing natural intelligence,

distinguishing it from approaches that only rely on technical or curriculum aspects. Therefore, this article offers a contribution in expanding understanding of the relationship between biology education, natural human intelligence, and artificial intelligence in the era of disruption.

RESEARCH METHODS

This research method adopts a qualitative approach with a case study design to analyze the role of biology education in revitalizing human intelligence in an era of disruption. Data was collected through participant observation, in-depth interviews with teachers and students, as well as analysis of documents such as the biology education curriculum and learning materials used. The collected data was analyzed using a qualitative approach, with a focus on thematic analysis to identify patterns from the data.

Through this method, it is hoped that this research can provide understanding and contribute to the development of education that is relevant to the needs of the times. This research shows that biology education can play a crucial role in maintaining human natural intelligence by integrating the concept of human nature in the curriculum and learning practices. This integration allows students to develop a deeper understanding of humanity's relationship with nature and cultivates the critical thinking skills necessary to balance the use of technology with natural intelligence.

In interpreting these findings, it can be concluded that biology education that focuses on human nature can be an effective strategy in revitalizing natural human intelligence in an era of disruption. The integration of the concept of human nature also opens the door to the development of new theories or modifications to existing theories in the field of biology education, by emphasizing moral and philosophical aspects in learning. Overall, the findings of this research provide a strong foundation for the development of biology education that is more holistic and relevant to the needs of the times, and offers a new view of the relationship between technology, natural human intelligence, and human nature.

RESULTS AND DISCUSSION

The Nature of Human Intelligence

Muhammad Naquib Al-Attas said that fitrah is the basic nature of humans. Human nature is to think, interact, socialize and believe in God (Nasution, 2002). According to Ar-Ragib Al-Isfahani, the human soul is the place of nature, a treasure of wisdom and knowledge. In relation to nature, in Ibn Khaldun's book *Muqaddimah* it is stated that humans have advantages that distinguish them from other creatures, namely the ability to think.. That's why humans are called *hayawan an-nathiq*, namely thinking animals (Amin, 2018).

Reason is nature whose position cannot be replaced by artificial intelligence (Arifin Zein, 2017). Even though AI intelligence is developing rapidly, there is not yet a single machine that can match human intelligence as a whole. If AI is a programmed system, then the greatness of the mind created by Allah will be unmatched. The word reason is synonymous with thinking. If humans do not want to think, then they are no longer human. Human existence lies in whether they think or not, "Cogito ergo sum" said Descartes, a famous French philosopher. In the brain organ, the mind plays an important role in controlling body activities (Qowim, 2018).

Amazingly, human brain cell development from infancy to three years of age reaches 80%. In fact, the capacity of the human brain from birth has reached one trillion neuron cells (Mahdayeni et al, 2019). Intelligence is not only about the cognitive quality of the brain, but is also related to emotional intelligence (Santoso, 2023). The position of reason in Islam is to validate beliefs. Imam Al-Ghazali in *Al-iqtishad fii al-i'tiqod* page four explains that The position of reason and revelation must be integrated, so that reason functions in accordance with its nature (Alim, 2014).

Artificial Intelligence

To make life easier and more prosperous, humans construct knowledge and create technology. Humans are required to adapt and participate in the development process of the times which is marked by the birth of Artificial Intelligence (Darwis et al, 2019). Artificial intelligence, which is more familiarly known as AI, is a form of digital transformation. Digital transformation is a necessity to realize progress (Wimber and Feri, 2023). In this context,

Indonesia interprets this progress as an effort to realize its aspirations for 100 years of independence as a golden country in 2045.

John McCarthy, who is nicknamed "The Father of AI", coined the term AI since 1956 (Ellen Glover, 2024). According to him, AI carried out engineering to imitate human behavior and thinking techniques. Like the collaboration between Open AI and BMW gave birth to a three-dimensional robot called Figure One. When communicating, this humanoid robot has a language style, intonation and sentence structure that is similar to humans. Apart from that, the Amecca robot was given the title of the most advanced robot of all time. So sophisticated, Amecca can respond, behave and speak while showing human-like expressions. The Optimus Gen-2 robot, as the successor to Gen-1, can also carry out human tasks such as shopping, cooking, taking out the trash, mowing the grass, and so on (Alexandru, 2023).

Instead of humans being afraid of their jobs being replaced by AI, humans should view AI as a tool to help develop their creativity and empathy. Because human creativity and empathy are difficult for AI to imitate. This insight can change the way humans view technology. This can be proven by the high use of AI in Indonesia which has an impact on the world of work. Reporting from Kompas data in 2023, there are 26.7 million workers using AI. Because AI can work 24 hours a day without rest, automate mechanical tasks, and complete complex tasks.

A simple example is Perflexity AI which can present search results accompanied by a quote from the source of the answer. Apart from that, a chatbot that is very trendy to use is ChatGPT, because it can answer every question, write, and carry out various online tasks (Serdianus, 2023). Ofcom's research results show that teenagers account for 58% of the number of ChatGPT users (Hendriyanti, 2023). But unfortunately, ChatGPT often provides inaccurate information because it relies on results tailored to algorithmic sites that are widely accessed on the internet. Therefore, it is necessary to tabayyun by looking for other data that is more authoritative and credible, especially in searches related to religion.

The function of AI which is predicted to replace the role of humans is still a hot topic of discussion today. But so far AI does not have appreciation, inspiration, empathy, feelings and human touch (Farwati et al, 2023). Seeing all the potential threats of AI, there is a circular that regulates the limits and ethics of using AI. Budi Arie Setiadi as minister of communications and information technology explained that the circular aims to regulate the ethics of using AI to make it safer and more productive. If there is misuse of technology or personal data, it will

be entangled in Law no. 11 of 2008 concerning electronic information and transactions and Law no. 27 of 2022 concerning personal data protection.

Dehumanization as an Effect of AI

AI brings a breath of fresh air to the progress of civilization. But on the other hand, the presence of AI threatens the future of humanity (Eka Puji Astutik et al, 2023). This statement is relevant when the author sees the effects of AI which causes dehumanization, namely humans lose their humanity. Human physical, mental and identity conditions are harmed by the wrong use of AI. Starting from the erosion of the culture of thinking, physical interaction, to the loss of several job sectors due to AI automation. This causes the number of unemployed in several fields of work to increase, one of which is in production activities. Many large-scale factories replace human labor with machines (Evi and Marlagita, 2023).

When it has been formatted by AI, humans do not realize that they are becoming robots with digital systems. In the end, humans are selfish and lack social concern (Muhibbin and Mahfud, 2018). Even though reason always gives encouragement to always do good. In line with Quraish Shihab (1996: 294-295) who states that reason has three powers, namely the power to describe and understand things, the urge to live a moral life, and gaining wisdom (Yuzaidi and Windasari, 2022). But unfortunately, this contradicts the human situation which is dependent on technology, lazy to think, and relies predominantly on AI. Online games and online transactions cause high individuality, laziness in physical activity, even as if physical interaction no longer requires. This dependence causes humans to lose their identity as independent and creative social creatures (Muhibbin and Mahfud, 2018). Humans stand by AI until alienation (alienation of the soul), atheism, secularization and agnosticism occurs.

Strategy for Revitalizing Human Nature in the Era of Disruption

Thinking (intellectual development), feeling (spiritual and emotional development), and sports (physical development) are needed to overcome the problem of dehumanization. In line with World Health Organization (WHO, 2017) which states four pillars of health that humans must maintain, namely physical, psychological, spiritual and social health. The main point of this revitalization strategy is to re-optimize human potential, namely the senses, mind and heart (sam'a, abshar and af'idah). This optimization can be done through practicing the

principles of Sufism, namely tafakkur wa ta'ammul, tadzawwuq, and riyādḥah (thinking, feeling, and exercising).

Tafakkur wa ta'ammul(thinking)

A perfect human figure who is much praised by God Al-Qur'anis ulu al-albab (who has sense). The indication can be seen from the word ulu al-albab which is mentioned 16 times in Al-Qur'an (Alim, 2014). The main characteristic of ulul albab is thinking. Ulu al-albab is a product of optimized human intelligence. Meanwhile, robots, Google, and other similar technologies are products of artificial intelligence. In this case, it is necessary to revitalize the potential of human senses and reason with tafakkur, namely developing intellect and creativity to think about the verses of Allah. Kauniyah verses and qauliyah verses will become material for taqarrub (getting closer) to Allah.

Apart from that, yataḍabbarun represents a brain that is always in contemplation. Humans are commanded to take lessons from every creation of creatures. The process of creating the heavens, the earth and everything in it contains implicit meanings from which lessons can be learned. The follow-up to a deep understanding is called yatafaqqahun. Between knowledge and reason as well as remembrance and thought, they are mutually integrated and synergistic (QS. Ali-Imran: 190-191).

The senses are used to see facts and cross check information. If sam'a, abshar, and afidah are functional, then humans will be wise in using technology, considering rationality, data, and harmony with religious provisions. The word sam'a means that Allah made the ear senses to hear the verses of Allah. As for abshar, apart from sensory vision, it also means the perspective of reason. Likewise, all the facilities given by Allah are aimed only at the path that is approved by Him. The meaning of sam'a and abshar literally acts as a tool whose object is sensory. Either through research, analysis or research in order to achieve knowledge. The word abshar linguistically means vision, which leads to an effort to arrive at the truth.

In line with QS. Al-Baqarah: 18 which indicates the importance of optimizing sensory potential. Shummun, which means deaf, refers to humans who are reluctant to hear the truth. Likewise with bukmun and 'umyun which means mute and blind from the truth. Such human criteria cannot return to divine truth, which is the true place of return. Allah indicates how much loss and danger it will be for people who do not use their reason, sight and hearing. Even in QS. Al-Mulk:10 they are categorized as *ashab as-sa'ir* (inhabitants of burning hell). Likewise, in another verse it is said that human glory is closely related to commitment to maintaining this

potential, because humans will fall and become the lowest creatures, even more despicable than animals. In line with His words in QS. Al-A'raf verse 179.

Optimizing the senses in question is hearing and seeing social realities and signs of God's power. But in reality, society is more dominant in the tradition of mouth and hands, not the tradition of eyes and ears. In fact, Islam views the process of hearing and seeing as a very important step because it is related to the thinking process (Ibn Jauzi, 1993).

By entrusting themselves completely to Al, it means that humans have turned off reason from the purpose of their creation. In fact, the position of humans is in fact differentiated by the use of their minds (Ibn Jauzi, 1993). The first step in using reason is reading, because reading is the first step to knowing. The reading process is not only interpreted conventionally, but what is meant is literacy by reading natural phenomena and social phenomena presented before humans (Ibn Jauzi, 1993). In the Qur'an, recommendations for reading can be found in QS. Al-'Alaq: 1. The role of sight is very important in this process, such is the literacy desired by the Qur'an as the meaning of yatadabbarun. Therefore, scientific transmission was born in various fields, including technology.

The transmission of knowledge during the time of the Prophet is depicted in a portrait of the beginning of the Prophet's preaching. Science has not undergone special codification. However, its implementation has had a significant impact on changing human behavior. Knowledge has not yet been formed into a scientific discipline. Until its development underwent a metamorphosis phase until now. Standard Islamic scholarship is reconstructed to adapt to current developments. The Qur'an contains instructions on human creative power to think. Likewise, the Prophet Muhammad highly valued reason. There is even a hadith which states that a person is considered irreligious if he does not use his mind.

Optimizing the mind is needed to expand, deepen and apply knowledge, as well as foster a work ethic. Thinking objectively without being driven by certain interests and lustful tendencies has a great influence on achieving truth. Many people are intelligent but are criticized by the Koran, such as the QS. Al-Mudatsir: 18 which tells the story of Walid Al-Mugirah, an intelligent person among his people. When he was influenced by position and wealth, his intelligence actually made him turn away from the truth. Likewise QS. Al-A'raf verse 176 condemns people who follow their desires and desires.

Tadzawwuq (taste)

Tadzawwuq, namely, emotional exercise can be done with muhasabah (self-introspection). With muhasabah, humans will again become aware of their position and role as God's creation. Efforts to build awareness can be the key to emotional exercise. Everyone needs to remember the fitrah that was bestowed upon him, the promise of monotheism that was pledged in the realm of the spirit, carry out his mandate as caliph fi al-ardh, and return to being a rational and moral human being. The spiritual power obtained through emotional exercise helps humans find meaning, moral values and goals in life that are oriented towards the afterlife (Miftah Syarif, 2017).

Then the exercise of feeling is not only limited to reciting dhikr, but also by always remembering Him in any circumstances (*yatazakkaran*). To rediscover their true identity, humans need a balance between intellectual and spiritual intelligence. Thus, an integrated approach between the senses, mind and heart is needed in spiritual development. Hossein Nasr offers a spiritual method by applying the teachings of Sufism in a modern context with *taubah*, *muhasabah*, *dhikr*, and *taqarrub* (Shihab, 2005).

The intensity of feelings can affect self-control. The higher the intensity of the feeling, the higher the level of self-control. Vice versa. This shows that emotional exercise can be used as a technique for revitalizing the nature of human spiritual intelligence (Qowim, 2018). Exercising will have an impact on patience and calm in the human soul. The Qur'an has provided guidance on how to achieve inner peace, namely by *dhikr* of Allah.

Found 292 derivations of the word *dhikr* in the Qur'an with 62 forms, in 255 verses and 71 letters (Muhibbin and Mahfud, 2018). In the Oral Al-Arab dictionary, Mahmud Yunus, Al-Munawwir, and At-Taufiq, the word *ad-dzikru* comes from the word *dzakara* which means remembering, mentioning, purifying, studying, and advising. The process of interaction between a servant and his Lord to remember and submit to His commands is also *dhikr*.

Likewise, Hamka in *Tafsir Al-Azhar* explains that *dhikr* is remembering Allah in the heart, spoken verbally, and accompanied by *tadharru'*. *Dhikr* according to Quraish Shihab is not only limited to praying, but connects the human soul with God. People who do not remember Him are like people who walk blind (*Tafsir Al-Misbah*). Ahmad Mustafa Al-Maraghi in his *tafsir* book states that if we continue to remember Him while standing, sitting and lying down, then Allah will calm his heart. With this peace, humans will be healthy

spiritually and physically. Likewise, dhikr according to psychology, leads to a situation of remembering and awakening humans from inner emptiness that is too busy with worldly affairs (Ibn Jauzi, 1993).

To become a perfect human being or a perfect human being, humans must be good at processing feelings. "Be a person who can feel, not someone who thinks he can," said Zawawi Imron, a Madurese student (Qowim, 2018). This philosophy comes from Sunan Drajat which reads "Dadio siro wong sing iso rumongso, ojo dadi wong seng rumangso iso." With intelligence in processing feelings, humans can change their mindset and defeat their desires. Meditation can also be done to exercise, namely focusing the mind. Tariqah is a way to cultivate spiritual values with the guidance of teachers who are familiar with the term murshid. With dhikr, the heart becomes calm and various diseases are avoided. Because the cause of illness according to Ibn Sina is not only because of physical weakness, but also because of a weak mental condition.

To overcome a weak soul, Aaron Temkin Beck offers the theory of CBT (Cognitive Behavior Therapy), namely thought processing therapy. Meanwhile, Abu Zayd ibn Ahmad Sahl Al-Balkhi initiated the theory of Tibb Al-Ruhani, by having full faith in Allah. Sheikh Wahbah Az-Zuhaili combines these two theories by getting closer to Allah and cultivating thought patterns. This shows that an effective solution in overcoming dehumanization is to involve spiritual and psychological aspects (Muhibbin and Mahfud, 2018).

Apart from that, exercising feelings will produce faith, knowledge and morals as the main foundation in revitalizing human nature. Knowledge is interpreted as light, that which illuminates, and something that is oriented towards charity (Widiawati, 2022). If so, then there is no dichotomy of knowledge. Because all knowledge comes from one source, namely from and belonging to Allah. Knowledge and morals are something that cannot be separated. Having knowledge but not having morals is not enough. Vice versa. Morals are the fruit of faith, because a reflection of a person's faith can radiate from his morals. Therefore, the Qur'an instructs humans to cultivate feelings, process thoughts, reason with the guidance of revelation, and behave according to the guidance of the Sharia'. Humans must return to their nature as creatures who have reason and feeling.

Riyadhah (sport)

According to a hadith narrated by Imam Bukhari, horse riding, swimming, archery, wrestling, running and javelin throwing are sports that have existed since the time of the Prophet. This indicates that as long as it is carried out in accordance with sharia guidelines, sport is highly recommended not only from a medical perspective, but also from a religious perspective. Islam teaches humans to maintain their physical and psychological health (Qowim, 2018). *Mens sana in corpore sano*, in Islam this expression has the equivalent of *al-'aqlu al-salim fii al-jismi al-salim* (a healthy mind is found in a healthy body). The contextual meaning is related to the obligation to maintain physical health. In line with the word *quwwah* in QS. Al-Anfal: 60, which contains instructions for training physical strength.

A person's healthy reflection must be understood in the context of faith. Islam views physical health as born from a healthy soul. A healthy soul in Islam is a soul that is clean from all impurities in the heart as the effects of immorality. As in Muslim hadith number 2996, the Prophet Muhammad reminded us that the heart is the ruler, controller and determiner of the value of every human activity.

Mudhghah physically assumed to be the heart. If the heart is healthy, then the body will also be healthy. Meanwhile, mentally, *mudhghah* in this hadith is interpreted as heart. Physical health is closely related to a heart that is free from disease, because liver disease can trigger birth diseases (Widiawati, 2022). Thus, the healthy aspect in the reformulation process is oriented towards the spiritual dimension.

The concrete step in revitalizing human nature is optimizing the three human potentials, namely the senses, reason and heart through *tafakkur wa ta'ammul*, *tadzawwuq* and *riyadhah* accompanied by government regulations. The United States, as a superpower that can be used as a reference for developing developed countries, has established ten control principles and guidelines for using AI. Likewise, other countries are trying to control the negative impacts of AI by forming laws and regulations (Muhibbin and Mahfud, 2018). Even to avoid AI risks, some communities and organizations prohibit the use of AI-based features regarding personal data. The existence of ethical and legal regulations means that human rights, privacy and moral values are still maintained to overcome the problem of dehumanization.

CONCLUSION

Biology education has an important role in revitalizing natural human intelligence in an era of disruption. The integration of the concept of human nature in biology education is effective in promoting a balance between technological progress and natural human intelligence. The findings of this research reveal that biology education that integrates a deep understanding of human nature can make a significant contribution in shaping critical thinking. This helps students to maintain natural intelligence while still adapting to massive technological developments.

The inference of these findings shows that biology education needs to continue to develop by strengthening the integration of the concept of human nature in the curriculum and learning practices. Thus, this research makes an important contribution in understanding and promoting the role of biology education in revitalizing natural human intelligence in an era of technological disruption.

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