e-ISSN: 3026-7544

Indonesia Journal of Engineering and Education Technology (IJEET)
Volume 2 Nomor 2, p :91-98

Era 4.0 Curriculum Development Design

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Abstract

In facing the era of the Fourth Industrial Revolution, curriculum development design becomes crucial to ensure relevant and competitive education. This journal explores the concepts, strategies, and challenges in designing a curriculum that integrates the learning needs of the digital era. The primary focus is on incorporating advanced technologies, such as the Internet of Things (IoT), to ensure learners have a profound understanding of these concepts and can apply them in real-world contexts. This research is a literature review, concluding that the design of 4.0 era curriculum development must be proactive, innovative, and centered on developing competencies that encompass both technical and non-technical aspects. Consequently, education can make a significant contribution to shaping individuals who are ready to compete and adapt in the ongoing digital transformation era.

Keywords: Curriculum**,** Curriculum Development, Fourth Industrial Revolution, Design, Education

INTRODUCTION

In the 4.0 Era, we are witnessing a significant educational paradigm shift, blurring the line between traditional models and more dynamic and responsive models. Technology plays a central role in the learning process, changing the face of education as a whole. The understanding of the importance of skills such as problem-solving, creativity, and critical thinking is deepening, creating new demands for educators and learners.

In this context, education is no longer only about transferring knowledge, but also about forming adaptability and innovation. An educational model that is responsive to technological developments and the needs of the job market is the key to success. Education is becoming a thriving ecosystem, creating opportunities for the development of 21st century skills.

The importance of skills such as problem solving created a change in the approach to teaching. Teachers are not only conveyors of information, but also facilitators to guide students in exploring and understanding complex concepts. Creativity and critical thinking are strengthened through approaches that promote experimentation, collaboration, and reflection. Education is no longer limited to the classroom, but involves continuous lifelong learning.The 4.0 era presents unique challenges and opportunities in the world of education. How we integrate technology effectively, develop relevant skills, and ensure inclusivity in education are questions that require reflection and collaborative action. Thus, this paradigm shift creates a dynamic stage for educational innovation and renewal, preparing future generations to face an ever-changing world with the confidence and expertise required.

Greenstein (2012) in Lukum (2019), suggests that education in the era of the Industrial Revolution 4.0 is considered as the development of three main skills of the 21st century, namely the skills to think, act, and live life in the world. Thinking skills include critical thinking, creative thinking, and problem-solving abilities. Action skills involve the ability to communicate, collaborate, digital literacy, and technological literacy. Meanwhile, the skills of living life in the world involve initiative, self-directed ability, global understanding, and social responsibility.

These skills are a vital foundation in preparing individuals for success and relevance in an ever-changing world. Thinking skills, which include critical thinking, creative thinking, and problem-solving abilities. In the face of the complexity of today's challenges, the ability to critically evaluate information, come up with innovative ideas, and find practical solutions is becoming increasingly important.

The second essential skill is the skill of acting. These skills involve a variety of aspects, including the ability to communicate effectively, collaborate with others, as well as digital literacy and technological literacy. In an era where connectivity and interaction between individuals is increasing, the ability to communicate clearly, work together in teams, and understand digital technology is key to achieving success.

Furthermore, no less important is the skill of living life in the world. It involves aspects such as initiative, self-directed ability, global understanding, and social responsibility. Individuals who are able to take initiative, manage themselves well, have a global outlook, and feel responsible for their society, will have an advantage in facing the challenges of an increasingly connected and interdependent world.

By recognizing the importance of these three main skills, education in the era of the Industrial Revolution 4.0 needs to pay greater attention to the development of these dimensions. Through this approach, individuals can be well prepared to face the evolving dynamics in an increasingly complex society and world of work.

According to Putriani (2021) The development of the industrial revolution to enter the industrial revolution 4.0. Characterized by a fusion of technology and blurring the lines of physical, digital, and biological space. The industrial revolution 4.0 is synonymous with disruption, disruptive because almost all domains of life are converting from manual to digital. So that this revolution has a correlation with education, this education is commonly referred to as education in the era of revolution 4.0 or education 4.0. Education 4.0 is a response to the needs of the industrial revolution 4.0 where humans and technology are aligned to create new opportunities creatively and innovatively.

The curriculum itself is a fundamental element that is often overlooked in the world of education. The curriculum is complex and diverse, from the beginning to the end of the learning process. Furthermore, the curriculum is considered as the core of education and should be evaluated periodically in line with current developments, with an innovative and dynamic approach. In the era of technology utilization, people's demands for the development of skills and knowledge are increasing along with the development of science

and technology. Therefore, the world of education must be prepared to face the changes and developments that occur, with the aim of training the next generation with the right skills to compete in an increasingly advanced world. One of the steps that institutions can take is to continue to refine the existing curriculum.

RESEARCH METHOD

The method applied in this study is literature research, which refers to the process of collecting data by compiling information from various literature. In accordance with the definition presented by Annur (2014), literature research is an effort to collect materials and information from various sources that can be accessed in libraries, such as books, journals, reports, documents, or notes.

For the stages as stated by Hamzah (2021), namely Collecting various sources, then reading and reviewing these sources, then recording core information that is still relevant to be compiled as a conclusion, and finally realized in written form. From this process, it can be concluded that the type of data used is qualitative descriptive. This qualitative descriptive data is used to examine the relationship of attitudes, activities, views, and processes that occur to a phenomenon, with an attempt to describe the object or subject according to its reality.

RESULT AND DISCUSSION

Provide Curriculum Design

Curriculum design plays a very important role in the context of education. The first step that must be taken before the curriculum can be implemented is through a careful design process. This process is not only technical in nature, but also includes deep consideration of the important elements that are interrelated.

In designing the curriculum, it is necessary to pay attention to the relationship and interrelation between various elements. This includes identification of student needs, learning objectives, effective teaching methods, and accurate assessment. Each of these elements must be considered holistically to achieve optimal balance in the designed curriculum. By understanding these complex dynamics, curriculum designers can ensure that educational goals can be effectively achieved.

One crucial aspect of curriculum planning is ensuring alignment between the designed curriculum and the demands of student needs and development. This process involves an in-depth analysis of student characteristics, individual potential, and societal needs. Thus, curriculum designers can create relevant and meaningful learning experiences for each student, creating a strong bond between learning materials and everyday life.

It is also important to recognize that curriculum design is not a static process. Over time, technological developments, social changes, and other dynamics can affect the effectiveness of the curriculum. Therefore, curriculum designers need to be responsive to these changes and be able to make the necessary adjustments so that the curriculum remains

relevant and effective in the face of the evolving dynamics of the world of education. Thus, curriculum design is not only the initial stage, but also a commitment to ensure quality education and in accordance with contemporary needs.

These elements also include organizing activities that will be included and implemented in the curriculum development process. This process involves selecting learning experiences in educational units, as well as establishing the roles and positions assumed by teachers, students, and other elements involved in curriculum planning.

Curriculum design refers to the planning or structure of curriculum elements, involving objectives, content, experiential learning, and evaluation. One of the key aspects of the curriculum is the conceptualization and arrangement of the various components within it. In curriculum organization, curriculum design is related to horizontal and vertical arrangements. Horizontal organization, often referred to as horizontal coverage or integration, handles the arrangement of curriculum components. Meanwhile, vertical organization, or sequence, focuses on the relationships between the various components of the curriculum.

Curriculum design refers to the patterns, frameworks, or organizational structures used to select, plan, and enhance the educational experience in a school environment. The design process involves planning and selecting the factors, rules, formats, and techniques necessary to achieve specific goals in education. The implementation of concepts, objects, and strategies is involved in achieving these goals. According to Charles Reigeluth, the purpose of curriculum design is to plan optimally and precisely how to achieve the desired educational goals. Globally, curriculum design can be considered as the result of deep thinking of experts about the essence of education and learning.

In other words, the curriculum is a guide for a group of topics and materials taught by educators to students. This definition also includes learning planning aimed at achieving a specific outcome. Some experts argue that the term "curriculum" has a broader scope compared to the previous definition. Curriculum can be interpreted as a document that contains a series of educational and teaching programs in a school that must be implemented within a certain period of time, both annual and semester. Understanding curriculum also includes the understanding that the curriculum is an educational program that is planned and implemented with the aim of achieving certain educational outcomes. Herlina (2018) suggests that the curriculum has a crucial role in the advancement of education in Indonesia. Redesigning education is considered the right action to improve the quality of education.

Curriculum Development

The role of curriculum in education has enormous significance. There are three main roles of the curriculum, namely conservative, critical and evaluative, and creative. The importance of maintaining a balance of application of these three roles is highly recognized. In addition to having a role, the curriculum also carries several functions, such as adjustment, integration, differentiation, preparation, selection, and diagnostics. All these functions are

implemented thoroughly by the curriculum and have a significant impact on the growth and development of students, in line with the educational objectives set by the relevant educational institutions.

Therefore, it is important to develop a curriculum in order to fulfill its role well. Institutions must have the ability to design curricula that can function optimally in the learning process in them. Stakeholders involved in curriculum development of an educational institution need to have a good understanding of the curriculum and its components. Once the curriculum is formalized, the educational institution must be able to implement it successfully according to the needs and characteristics of the institution.

In order to implement the curriculum, there are components that need to be developed so that the process can run smoothly. The development of this curriculum is expected to achieve the educational goals set by each educational institution optimally. One of the steps that need to be taken in curriculum development efforts is to organize and design the curriculum carefully.

Fauzan and Arifin (2022) suggest that the curriculum development process is a series of activities carried out continuously, curriculum development activities are a series of activities that are interconnected between one activity and another activity, activities in which must contain elements of planning, implementation, and evaluation.

With the above principles, designing a curriculum is certainly something very important and must be done carefully considering the many elements of life that contribute to the implementation of the curriculum.

The creation and refinement of the educational curriculum is considered very important. In Indonesia, a new educational curriculum called the Merdeka Learning Curriculum is currently being developed, which focuses on the ability of students to take learning. The Merdeka Belajar curriculum is a learning approach where students have the freedom to choose and determine their learning methods. However, education units still have to comply with the standards of learning achievement objectives that have been set and mutually agreed. This standard still applies even though learning is carried out based on students' learning ability. The entire process of developing learning activities is then based on agreement on the learning objectives to be achieved. Therefore, independent curriculum development needs to refer to KKNI as a guide in developing learning so that graduation goals are still met.

Curriculum Development Design era 4.0

The educational curriculum is flexible because in the process of its development, it must be able to adapt to the demands and characteristics of students in accordance with changing times. The design and development of educational curricula needs to consider the needs, views, experiences of learning outcomes, and the interests of students as the main focus, so that the center of attention in education is the students themselves. In Indonesia, the education curriculum has undergone a number of transformations since 1947, initially

known as the 1947 Rentjana Learning Curriculum, and has now developed into the Merdeka Curriculum. So far, there have been 10 changes in the education curriculum in Indonesia, namely in 1947, 1952, 1964, 1968, 1975, 1984, 1994, 2004, 2006, 2013, and 2022. (Cholilah, et al. 2021)

The 21st century brings new challenges that require mastery of special skills so that humans can face the changes of this era. Terms such as "industrial century 4.0", "century of information technology", "century of knowledge-based economy", and the like are used to describe this period. Changes in this century are unpredictable and occur quickly, with no fixed patterns that can be identified in various sectors of life, including technology, communication, information, education, economy, transportation, and others. If not prepared in a systematic, structured, and measurable manner from the start, these unpredictable changes can become opportunities or threats. A good balance in taking advantage of these changes can be success or failure, depending on the extent to which humans are able to take advantage of them. Education in the 21st century needs to include mastery of information and communication technology, as well as knowledge, skills, and attitudes that are in accordance with the demands of the times.

In the process of curriculum design, the emphasis on student diversity is very crucial. To create an effective curriculum, it is necessary to consider the different learning styles among students. Each individual has unique learning preferences, such as visual, auditory, or kinesthetic learning. By understanding and accommodating these preferences, curricula can become more inclusive and responsive to the needs of diverse learners.

In addition, aspects of cultural diversity must also be the main focus in curriculum design. The world of education includes learners from diverse ethnic, linguistic, and traditional backgrounds. Therefore, the curriculum should be designed to reflect this diversity and provide a relevant learning experience for all students. Learning materials should be able to embrace the cultural richness of students, so that they can see the relationship between learning and their daily lives.

It is also important to devise teaching methods that are interesting and relevant to all learners. A curriculum that offers a varied approach to learning can increase student interest and motivation. The use of technology, practical activities, and interactive teaching strategies can help create an engaging learning environment and stimulate intellectual growth. Thus, designing an inclusive curriculum requires deep thinking and careful planning to best meet the needs and diversity of learners. The implementation of a curriculum that is responsive to technological developments and digital transformation is very important to prepare students to face the demands of the 4.0 era. Trial-tested curriculum design strategies and approaches show that technology integration, 21st century skills development, and an emphasis on project-based learning are key elements in creating relevant and effective curricula.

In addition, adaptability and flexibility of the curriculum are crucial factors in facing the dynamics of the 4.0 era. The ability to continuously improve and adapt the curriculum

to new technological developments and industry trends is the foundation for creating graduates who have prepared themselves to face the upcoming challenges.

The design of curriculum development era 4.0 must be proactive, innovative, and centered on competency development that includes technical and non-technical aspects. Thus, education can make a significant contribution in forming individuals who are ready to compete and adapt in the era of continuous digital transformation. In the 4.0 era, digital literacy is not only an additional skill, but a basic need. Curriculum design should ensure that learners are not only able to use technology effectively but also have a deep understanding of the ethical and social implications ofusing it.

CONCLUSION

In the 4.0 Era, we are witnessing tremendous transformations in technology, which includes artificial intelligence, Internet of Things (IoT), and cloud computing. These changes not only affect the industrial world, but also permeate our daily lives. Therefore, it is important to ensure that the educational curriculum reflects this new dynamic.

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