



Innovative Learning Media in Era 4.0: A Review

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Abstract

Various learning media innovations continue to grow which acts as a supplement in learning. A good learning media is effective, and efficient, shortens the time for delivering teaching materials, and can stimulate the imagination of educators when getting factual information through the media. The research objective is to analyze learning media innovation in the 4.0 era. The method used is a review of articles from the Scopus database. Learning media is designed to provide a real picture of something abstract. The implementation of Industry 4.0 can be through various innovative learning media. The use of innovative learning media can be through gadget intermediaries or digitally as a means of connecting conventional learning media to innovative learning media.

Keywords: learning media, era 4.0, industrial revolution, innovative learning media

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Introduction

Strategies or methods used in the teaching and learning process so that students can actively develop their potential can be done with a good education system. The education system consists of learning, teaching, curriculum, student development, learning methods, learning tools, and infrastructure. According to behavioristic learning theory, learning is a change in behavior that can be observed directly, which occurs through stimulus-stimulus relationships and responses according to mechanistic principles (Asikin, 2018). Learning can be obtained through a good education. Through education, humans can become human beings with noble behavior. According to (Bpkm.go.id, 2006). Education is a conscious and planned effort to create a learning atmosphere and learning process. Education can develop self-potential to have religious spiritual values, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state.

The development of education is in line with the development of the industrial revolution that occurred in the world. The Industrial Revolution started from 1) Industrial Revolution 1.0 occurred in the 18th century through the invention of the steam engine, thus allowing goods to be mass-produced, 2) Industrial Revolution 2.0 occurred in the 19-20th century through the use of electricity which made production costs cheap, 3) The Industrial Revolution 3.0 occurred around the 1970s through the use of computers, and 4) The Industrial Revolution 4.0 itself occurred in the 2010s through intelligence engineering and the internet of things as the backbone of the movement and connectivity of humans and machines (. et al., 2020).

The first industrial revolution marked by the existence of a steam engine in the 18th century succeeded in drastically accelerating the economy which in two centuries has been able to increase the per capita income of countries in the world to six times (Groumpos, 2021). The second industrial revolution is known as the Technological Revolution. This revolution was marked by the use and production of iron and steel on a large scale, the widespread use of steam power, and telegraph machines. In addition, petroleum began to be discovered and used widely and the early period of the use of electricity. In the third industrial revolution, the manufacturing industry has turned into a digital business. Digital technology has taken over the media and retail industries. The third industrial revolution changed the pattern of relations and communication in contemporary society. This revolution has shortened distance and time, this revolution puts forward the real-time side.

According to Haag and Ken in Kadir and Triwahyuni (2013) state that information technology is a set of tools that help humans work with information and matters related to information processing. To date various information and communication media technology innovations that have been made by humans, especially as learning aids. Lecturers are facilitators to achieve learning objectives based on indicators arranged according to student needs. Several forms of indicators, including cognitive, psychomotor, and affective competencies. According to Rohmah and Marimin (2015) student success is one indicator of a lecturer's success in teaching. The implementation of learning must be well planned to provide the right service for students. One of the components supporting the achievement of learning objectives is the use of learning media.

Learning media becomes useful if used appropriately by lecturers and students. As revealed by Sadiman et al. (2012) planning learning media, among others; 1) identify the needs and characteristics of students, formulate learning objectives, 2) formulate the points of teaching materials, 3) develop success measurement tools, write media scripts, 4) conduct tests and revision. There are two characteristics of learning media, namely as distributors and providers of information. The principle of using learning media is effective and efficient, helps shorten the time for delivering teaching materials, and can stimulate the imagination of educators when getting factual information through the media. As stated by Kemp and Dayton in Falahudin (2014) good learning media are 1) time and energy efficiency, 2) overcoming the limitations of space and time, 3) overcoming the limitations of the human senses, and 4) making something abstract to concrete. Learning media is designed to provide a real picture of something abstract. The manipulative function of media allows lecturers to visualize something abstract into concrete. According to Gagne and Briggs in (Mertasari, 2022); (Syahdan et al., 2021), various forms of learning media, including books, tape recorders, cassettes, cameras, slides (picture frames), films, graphics, photos, pictures, television, and computers. When going to teach, a lecturer begins to think about and prepare the media that will be used for teaching support the delivery of teaching materials (Nenohai et al., 2023); (Hinneburg et al., 2020); (Hosen et al., 2021). Learning media is an intermediary instrument to convey messages according to the essence of the message in question. The characteristics of messages or information vary, so it is necessary to choose the relevant media to help convey the message correctly.

Media as information providers need to be developed appropriately to increase learning motivation (Darling-Hammond et al., 2020); (Daryanes et al., 2023). Placing the function of the media correctly will determine the lecturer's perspective in utilizing the media during the implementation of learning for students. The technique of selecting the right learning media needs to be improved so that it is functionally useful as a tool for lecturers and students.

Methodology

The method used is a review of articles from the Scopus database with the keywords learning media, era 4.0, industrial revolution, and innovative learning media. Next, the data was analyzed according to inclusion and exclusion criteria.

Result and Discussion

Technological developments affect changing learning styles, especially the use of learning media. According to Hasby in Andriani (2015), the history of the development of Information and Communication Technology (ICT) based learning systems has occurred in 5 (five) phases which are welcomed by changes in the role of the media in learning, namely 1) delivery of learning using the lecture method by lecturers, 2) delivery of learning materials through writing to record learning outcomes and can be recalled on another occasion, 3) invention of the printing press learning is done by using books, magazines and others, 4) the use of electronic media such as OHP which was later created in focus which can display images, audio and video as well as recording devices, 5) the use of internet media which allows lecturers to find learning resources or use it to do face-to-face learning without face-to-face. According to Bimo (2017), the development of learning media can be identified through 1) initially learning only involved lecturers and students, 2) the influence of communication media was marked by the emergence of AVA (Audio Visual Aids) and audio as a tool in the 20th century or around 1950. allows it to help learning, 3) is marked by starting to identify the selection of media for this type of learning certain experiences based on the desire, namely choosing the appropriate media for the characteristics of learning and the type of knowledge to be achieved, 4) programmed learning that allows a learning media to influence student behavior, 5) the use of media is not only a teacher's tool but functions as an integral part of the learning process. learning. According to Sanjaya (2010), an innovation is an idea, an idea that is implemented in the curriculum and learning that is considered new to solve educational problems. In addition, Sanjaya also revealed that teaching is not only conveying learning materials but also providing assistance to students in the form of using learning media (Hirsh et al., 2022). This means that delivering learning materials to students requires creativity and innovation from educators.

In delivering information to students learning media is needed that can bridge the delivery of knowledge (Ong & Quek, 2023); Learning media in the revolutionary era. The industry has arrived at the 4.0 era which is marked by the presence of new technology where there is collaboration between physical or digital equipment with Mobile Technology, and the Internet of Things to help learning. It is characterized by an independent and student-centered learning system. Trends in learning media in the 4.0 era, namely audio, video, image or illustration-based learning, web, and mobile-based learning as well as blended learning. The industrial revolution which has an impact on the educational revolution requires the presence of the required learning media (Mesterjon et al., 2022). The Industrial Revolution is an integration between cyber technology and automation, the change in the Industrial Revolution from human power to a digital industry (Ziatdinov et al., 2024); (Lee et al., 2018). The impact of the Industrial Revolution 4.0 has several characteristics as the main elements in developing industry in the 3.0 era towards industry 4.0, including (Youssef Abdelmajied, 2022); (Suleiman et al., 2022); (Sima et al., 2020); (Aoun et al., 2021)

- a. Internet of Things (IoT), the internet network as a connection in transferring data without human assistance.
- b. Big data, a lot of data information that has been input manually or automatically will be censored and entered into a data system.
- c. Augmented reality, collaborating virtual objects 2D or 3D and project in real-time.

- d. Cyber security, securing information to prevent cyber attacks.
- e. Artificial manufacturing, which is commonly called AI is a smart machine that has human-like intelligence, in this case, it can analyze data continuously and acceptably.
- f. System integration, connecting the system with the software physically and functionally.
- g. Cloud computing is a data storage technology that uses the internet to access programs without installation.

Internet of Things and networks. Industry term 4.0 is one of the German government's initiative projects to promote computerized manufacturing (Pivoto et al., 2021). Through this, the Industrial Revolution 4.0 has developed something that is beyond reason, by providing 4Cs skills or competencies which include: Critical thinking, Communication, Collaboration, and creativity. The four competencies that give birth to innovative learning for education. So that the media used as a means of developing the potential of students can be used effectively and efficiently. In the change towards era 4.0, some principles mark it, including:

- a. Technical assistance: can be physical or virtual
- b. Interconnection: both in the form of standards, security, and co-elaboration
- c. Information transparency: provision of information and data analysis
- d. Decentralized decisions

Conclusion

Utilization of technology can be utilized in the learning process. One example of the use of technology is the availability of applications that can be used as learning media. Learning applications that are available and easily accessible using a smartphone can be called mobile learning. In general, learning media has several uses or benefits, namely: 1) clarifying messages so that they are not too verbal; 2) overcoming the limitations of space, time, energy, and senses; creating a passion for learning, more direct interaction between students and learning resources; enable children to learn independently according to their visual, auditory and kinesthetic talents and abilities; 4) giving the same stimulus, equating the experience and giving rise to the same perception; 5) learning media can be used to channel messages (learning materials) so that they can stimulate the attention, interests, thoughts, and feelings of students in learning activities to achieve learning goals. The use of interactive multimedia can improve critical thinking skills.

Conflicts of Interest

The authors declare no conflict of interest."

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