The Application of Interactive and Intelligent Web in E-Learning

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Dear Editor

Web learning is a learning method in which the Web and its various services are used as a teaching tool for diverse learning activities. This can be a fully online learning process implemented through one of the web services, where the curriculum and learning activities are online or blended and intelligent. With the ever growing popularity of computers and networks, web learning (e-learning) has turned into a more feasible and accepted approach worldwide (1). Being an essential tool for supporting education and learning, the Web has become an important component of higher education programs. A variety of learning activities including communication, information retrieval, collaboration, evaluation, etc. are performed in this network. Researchers believe that web learning will continue to grow and claim a larger share of the higher education market (2).

The first type of collaborative and interactive web service is Web 2.0. It involves the integration of old and new technologies, which have changed the people's experience and knowledge of the World Wide Web.

Along with the development of Web 2.0, the potential types and values of user experiences in teaching and learning have also grown substantially. There are a number of network-based services that illustrate the essence of the Web 2.0 concept in learning: social networks, blogs, wikis, mass intelligence, podcasts, mashups, etc. They facilitate users' access to other related networks, where anyone can add data or edit the provided information space (3). Web 2.0 is collaborative and develops collective and interactive learning. The emergence of this concept extends the web environment to another level of intelligent interactions called the Semantic Web. In the Semantic Web or Web 3, advanced web services can intelligently interpret and transmit information on web pages to the learner. With the advent of Web 3.0, apart from human-to-human interactions, we are witnessing the emergence of machine-to-machine interactions, and not only does the learning take place in an intelligent manner, machines will also be able to understand and process information through machine learning. The Semantic Web is associated

with the development of the current Web, in a way that the data are given meaning in a clear and explicit way. Semantic web empowers people in the areas where they are weak and helpless. It will rationalize the use of the network and open up new possibilities in Artificial Intelligence (AI).

AI is a technology and a branch of computer science that studies and develops software and smart systems. It is described as "the study and design of intelligent elements", in which the "intelligent element" (or agent) is a system that understands the environment and takes the necessary steps to maximize its chance of success. The main debates in AI research are related to logic, knowledge, design, learning, communication, and understanding or ability to move or use objects. A variety of tools have been used in Artificial Intelligence, including some versions of research and mathematics optimization, logic, probabilistic and economics-based methods and a wide range of other fields. The discipline is founded on the premise that the core human ability, intelligence, can be so accurately defined that even machines can simulate it. One of the important areas of artificial intelligence is machine learning. Machine learning is a branch of artificial intelligence that studies and creates systems capable of learning from data. The main issue in machine learning is supply and generalization. Supplying data samples and the functions evaluated on the basis of these samples are all constituents of machine learning systems. Generalization means that the system functions well, even in dealing with unseen data samples. The circumstances in which this issue can be guaranteed is one of the main topics of study in the area of computational learning theory. There are a wide range of successful machine learning activities and applications. One particular case is optical character recognition, in which print characters are automatically recognized based on previous examples. Machine learning techniques also include: supervised learning, unsupervised learning, reinforcement learning. Numerous techniques are available for Artificial

Intelligence; however, only a subset from a much larger list of these techniques is called machine learning, which allows algorithms to learn from data. Ultimately, deep learning is a subset of machine learning that uses multilayered neural networks to solve the most complex computer problems.

The latest advances in the Web are in the field of IoT learning. Internet of Things (IoT) is sometimes referred to as Internet of Objects. IoT is a floating concept and depicts a future in which physical objects connect to the Internet and communicate with other objects. This concept is particularly important because objects will be more efficient when they can digitally present themselves and produce massive amounts of data that will significantly help in the areas of learning and acquiring knowledge (4). The Internet of Things encompasses many things, including appliances and environments around us that are connected to the Web. They can be controlled and managed by web services and applications on smartphones and tablets. In simple terms, IoT connects sensors and devices to a network through which they can interact with each other and with their users. There is a deep-seated relationship between IoT and e-learning. E-learning refers to a kind of learning that takes place "electronically" and usually involves the use of the Web and the Internet. E-learning makes the learning process more interactive and worthwhile. IoT has revolutionized e-learning and has had a major impact on the development of e-learning. Given new technologies such as smart boards, digital highlighters, RFID chips, QR codes, cloud-based technologies, along with data mining and big data analytics, IoT appears to hold a promising future for e-learning. Applying IoT and gamification concepts in e-learning will pave the way for smart, accessible, and engaging education. The Internet of Things is developing at a high pace, and with its development, great advances have been made in various other fields. In the area of education, IoT takes e-learning to an entirely new level. As a result, interactive and smart webs are being

developed to implement intelligent learning environments, which will, in turn, facilitate learning and increase content retention.

Authors' Contributions

M.B.N. developed the statement of problem & research methodology, A.S. collected the required data, and literature review. Both authors contributed to the final version of the manuscript.

Ethical Approval

The study protocol was consistent with the ethical guidelines of the 1975 Declaration of Helsinki as reflected in a prior approval by the Institution's Human Research Committee.

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Conflict of Interests

The authors declare that they have no conflict of interests.

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