



## Sociology of Education

### Investigating the Status of Internet of Things Development in Schools based on the Future Research

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**Purpose:** After the occurrence of the World Wide Web, the Internet of Things can be the next revolution due to the significant increase of the Internet, and this structure seeks to create a bridge between the real and virtual worlds, which has the ability to create an integrated network of billions of objects with the ability to connect wirelessly to each other to exchange information. So Considering the importance of internet of things in today's schools, the current research was conducted with the aim of investigating the status of internet of things development in schools based on the future research.

**Methodology:** This research in terms of purpose was practical and in terms of implementation method was quantitative. The research population were education managers and planners and officials of universities of Tehran city in the academic years of 2021-2022, which 281 people of them were selected as a sample by cluster sampling method. The tool of the current research was a researcher-made questionnaire of internet of things development in schools based on the future research with 26 items, which whose data were analyzed by exploratory factor analysis and one sample t-test in SPSS-26 software.

**Findings:** The findings of the exploratory factor analysis showed that the internet of things development in schools based on the future research has 26 items in 7 components of removing time restrictions (with three items of connection per hour, unlimited use and offline use), removing location restrictions (with four items of use in any place, use at school and home, use without special equipment and ability to use a computer), reducing infrastructure costs (with four items of sharing of training, direct transfer of training, eliminating special infrastructure facilities and direct connection to the system), knowledge management (with three items of knowledge creation, knowledge transfer and knowledge distribution), professional competence (with three items of cognitive competence, knowledge competence and skill competence), information technology (with three items of information flow automation, easy access to information and changing the shape of the organization) and effectiveness of educational system (with six items of efficient education, behavior patterns appropriate to time, talent-oriented appropriate to future needs, matching school input with future expectations, satisfactory educational process and providing satisfactory educational services appropriate to future needs). In this study, the factor loading of all 26 items was higher than 0.40, the factor loading of all 7 components was higher than 0.50, their average variance extracted was higher than 0.60, and their Cronbach and combined reliability was higher than 0.70. Also, the results of the one sample t-test showed that the average of all 7 components significantly was higher than the assumed average of the society ( $P < 0.001$ ).

**Conclusion:** Considering the importance of internet of things in schools and since the amount of all its components was slightly higher than the assumed average of the society, it is suggested that based on the questionnaire of the current research design and implement efficient and practical programs for the internet of things development in schools based on the future research.



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## Extended Abstract

**Purpose:** After the occurrence of the world wide web, the internet of things is the next revolution due to the significant increase of the internet, and this structure seeks to create a bridge between the real and virtual worlds, which has the ability to create an integrated network of billions of objects with the ability to connect wirelessly to each other to exchange information. Today, due to the increase in the growth of the internet and smart devices, a lot of attention has been paid to the internet of things or the internet of tools, and this technology means a network of physical tools along with electronic equipment that allows the tools to communicate with each other, with manufacturers and computer networks. The internet of things refers to a network which each object is identified through a tag and forms a network with other objects, and these objects can exchange data independently while communicating with each other. When objects are connected to each other or to other systems, they form a pervasive network that is present everywhere and covers various types of objects in a wide range that one of the important advantages of the internet of things is the possibility of controlling objects in order to improve life and from its limitations and disadvantages can be mentioned as threats to people's privacy and illegal access to data. The internet of things is a phenomenon that is increasingly present in the daily applications of human life, which is a network of physical objects embedded with electronic components, software, sensors and connections so that they can provide more value and services by exchanging information with the manufacturer, operator and other devices. The internet of things structure can help capture, communicate, store, access and share data from the physical world. This has created new opportunities in a wide range of areas such as electronic health, retail, green energy, manufacturing, city, smart home and user-personalized application. The internet of things turns each of the objects into tools that can be tracked, reviewed, and controlled through internet networks, and these tools include three parts: getting data from the device, sending data over the network, and performing operations based on the collected intelligence. In the emerging world, in teaching and learning new technologies is widely used from the internet of things. The internet of things is one of the technologies that can play an important and effective role in teaching and learning and change and transform educational methods. The internet of things in education which determine the internet communication between physical objects, sensors and controller, has greatly changed educational institutions and the concept of education. Today, the internet of things in education has changed from a knowledge transfer model to a self-directed active cooperation model with the influence of technology in educational institutions, and this has forced many institutions to teach and learn. One of the research approaches in any field is the future research approach, which this structure examines three futures includes possible futures i.e. the futures that are possible, probable futures i.e. the futures that are more likely to occur than other futures, and desirable futures i.e. the futures with desired values and ideals of employers and future researchers. The future research is the process of systematic effort to look at the long-term future of science, technology and strengthen strategic research areas, and the techniques and tactics of future research allow planners and decision-makers to have favorable options and alternative versions for their activities. Considering the importance of internet of things in today's schools, the current research was conducted with the aim of investigating the status of internet of things development in schools based on the future research.

**Methodology:** This research in terms of purpose was practical and in terms of implementation method was quantitative. The research population were education managers and planners and officials of universities of Tehran city in the academic years of 2021-2022, which 281 people of them were selected as a sample by cluster sampling method. In this sampling method, among the education managers and planners and also among the officials of universities of Tehran city, first some education offices and some universities were randomly selected and then all the education managers and planners or the officials of the universities were selected as a sample if there were conditions to enter the study. In this study, the conditions for entering the study with the coordination of the professors included having information in the field of internet of things and future research, at least a bachelor's degree, having at least two years of work experience and desire to participate in research. Also, in this study if any of the samples did not answer more than ten percent of the items, they were declared as missing and removed from the analysis. The tool of the current research was a researcher-made questionnaire of internet of things development in schools based on the future research with seven components of removing time restrictions, removing location restrictions, reducing infrastructure facilities, knowledge management, professional competence, information technology and effectiveness

of educational system and 26 items, which whose data were analyzed by exploratory factor analysis and one sample t-test in SPSS-26 software.

**Findings:** The findings of the exploratory factor analysis showed that the internet of things development in schools based on the future research has 26 items in 7 components of removing time restrictions (with three items of connection per hour, unlimited use and offline use), removing location restrictions (with four items of use in any place, use at school and home, use without special equipment and ability to use a computer), reducing infrastructure costs (with four items of sharing of training, direct transfer of training, eliminating special infrastructure facilities and direct connection to the system), knowledge management (with three items of knowledge creation, knowledge transfer and knowledge distribution), professional competence (with three items of cognitive competence, knowledge competence and skill competence), information technology (with three items of information flow automation, easy access to information and changing the shape of the organization) and effectiveness of educational system (with six items of efficient education, behavior patterns appropriate to time, talent-oriented appropriate to future needs, matching school input with future expectations, satisfactory educational process and providing satisfactory educational services appropriate to future needs). In this study, the factor loading of all 26 items was higher than 0.40, the factor loading of all 7 components was higher than 0.50, their average variance extracted was higher than 0.60, and their Cronbach and combined reliability was higher than 0.70. Also, the results of the one sample t-test showed that the average of all 7 components significantly was higher than the assumed average of the society ( $P < 0.001$ ).

**Conclusion:** Considering the importance of internet of things in schools and since the amount of all its components was slightly higher than the assumed average of the society, it is suggested that based on the questionnaire of the current research design and implement efficient and practical programs for the internet of things development in schools based on the future research.