Implementation Of Internet Safety And Health Monitoring (K3) Based On Internet Of Things (IOT)

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Abstract.
The use of computers in the future can dominate human work and defeat human computing capabilities such as controlling electronic equipment remotely using internet media, IoT (Internet of Things) allows users to manage and optimize electronics and electrical equipment that uses the internet for Automation of Occupational Health and Safety (OHS) Internet-Based Electricity Of Things (IoT). Design of Automation Occupational Health and Safety (OHS) Electricity Based on the Internet of Things (IoT). which is used to test the installation of research instrument equipment. This needs to be done to ensure that the installation and research instruments function properly at the actual time of the experiment. Devices that have been made by the researchers can work well as expected, where the automation of the protection of Occupational Health and Safety (OHS) Internet-Based Electricity of Things (IoT) so that it can provide initial help in the event of work accidents caused by gas leakage and fire monitored online by panel space operators. That's because most of the interactions between IoT devices with Users occur in digital form. Besides, expertise in reading digital data to support the decision-making process is also very crucial from the results of the calculation of the implementation of data monitoring of Occupational Health and Safety (OHS) Internet-Based Electricity of Things (IoT) with an average of 3.54 and the eigenvalues value approaching 29.4, indicating that the majority of workers in a private hospital in Malang City strongly agrees with the application of Internet If Things in the private hospital in Malang City Environment.

Keywords: *Internet of Things, implementation, occupational health and safety.*

I. INTRODUCTION

In this globalization era, it is not only information and communication technology that is increasingly developing, but also technology in the health sector. The level of need for health in modern society is somewhat more complex. This is what influences health experts to provide more optimal services to meet the needs and demands of the community. One of the most sought after health services today is the hospital. The use of computers in the future can dominate human work and defeat human computing capabilities such as controlling electronic equipment remotely using internet media, IoT (Internet of Things) allows users to manage and optimize electronics and electrical equipment that uses the internet. This speculates that shortly communication between computers and electronic equipment is capable of exchanging information between them thereby reducing human interaction. This will also increase the number of internet users with various internet facilities and services.Internet of things has become a separate field of research since the development of internet technology and other communication media, the more growing human needs about technology, the more research that will be present, the internet of things is one of the thoughts of researchers who are optimizing several tools such as media sensors, radio frequency identification (RFID), wireless sensor networks and other smart objects that allow humans to easily interact with all devices connected to the internet network. (Junaidi 2015).

The aim of this research is to build a prototype of remote device that uses TCP/IP that could connect to a local network through a web server. The prototype has two features, firstly the prototype can toggle single specific lamp and turn off and turn on the lamps in an entire building. It is controlled through a web application which can also be operated through smartphones and computers. The experiment result shows that the prototype needed 500 seconds delay to activate the lamp and fan relays through the web server. (Handayani et al. 2019) IoT (Internet of Things) is a concept that aims to expand the benefits of continuously connected internet connectivity. Basically IoT (Internet of Things) refers to objects that can be uniquely

identified as virtual rep-resentative in internet-based structures. How it Works IoT (Internet of Things) is an interaction between machines that are automatically connected without user intervention and at any distance. In order to achieve the workings of the IoT (Internet of Things) above the Inter-net is the liaison between the two machine interactions, while the user only serves as a regulator and supervisor of the working of the tool directly. The Internet of Things application, the NodeMCU ESP8266, is used to use a smartphone so that it can be controlled remotely and then add a rain sensor to anticipate sudden rainfall. If a rain sensor is detected by water, the relay web component system will activate and give a command to NodeMCU esp8266, after the program runs the relay will be active and the motor can run forward or backward if the relay turns on and the Relay is turned off then the motor cannot work forward or backward. (Salihi, Hulukati, and Humena 2019) According to the Regulation of the Minister of Health of the Republic of Indonesia (PERMENKES) No., 340 / MENKES / PER / 111/2010 regarding the definition of the Hospital explained that the Hospital is a health care institution that organizes individual health services in a complete manner that provides inpatient, outpatient and emergency services. From this understanding, it can be concluded the basic function of the hospital is to provide health care facilities to the community.With this basic function, the hospital must still seek Occupational Health and Safety (OHS) for all hospital workers (Kemenkes, 2010; Ristiono and Nizwardi, 2010).Occupational Health and Safety (OHS) is an inseparable part of the labor protection system and for construction service work can minimize and avoid the risk of moral or material loss, loss of working hours, as well as human safety and the surrounding environment which can later support improved performance effective and efficient in the development process (Sholihah, 2012).

Work safety and health efforts must be organized to realize optimal work productivity in all workplaces, especially those that are at risk of health hazards and prone to disease. Therefore, hospitals are included in the workplace criteria with various potential hazards that can cause health impacts such as potential radiation hazards (Ministry of Health, 2010). According to the Regulation of the Minister of Manpower of the Republic of Indonesia Number 12 the Year 2015 Concerning Occupational Health and Safety (OHS) Electricity in the Workplace The implementation of K3 electricity as referred to in Article 2 aims to protect the safety and health of workers and others who are in the workplace environment from potential hazards electricity, creating safe, reliable electrical installations and providing the safety of buildings and their contents, and creating a safe and healthy workplace to encourage productivity. include planning, installation, use, change, maintenance, inspection, and testing. (Republic of Indonesia Minister of Law and Human Rights 2015).Electrical properties are not visible and cannot be touched. We know there is electricity after seeing the consequences, such as lights on, fans spinning, and the radio sounds. There are three dangers caused by electricity, namely electrocution, heat or fire, and explosion. The installation of electrical installations, usually prone to accidents. Accidents can arise as a result of direct contact with current flowers or errors in the installation procedure. This research is expected to provide early protection and protection regarding Occupational Health and Safety (OHS) Electricity Based on Internet of Things (IoT) in Electrical Installation of Malang Hospital and the factors that influence it so that later recommendations can be given to reduce the risk of being exposed to electrical hazards. at a private hospital in Malang City.

II. METHODS

2.1. Research Population

The population in this study were all technical personnel or employees related to electricity in the Private hospital in Malang City

2.1.1 Research Samples

a. The sampling method used was simple random sampling, which is a sampling technique involving all members of the existing population (Sugiyono, 2010), with a minimum sample size of 100 Technical Staff or Employees of Private hospital in Malang City.

b. The research sample is in the form of a trial of the Internet-based Electricity of Things (IoT) Monitoring Tool.

2.2. Research variable

The variables in this study are divided into independent variables and dependent variables. The independent variables in this study were age, education level, work experience in the electricity sector, and Electricity Safety and Health Monitoring.

2.3. Method of collecting data

Data Collection Tool

In this data collection, the tools used were questionnaires for data on age, level of education, work experience, planning, organization, actuating, controlling, Monitoring in the application of K3 Electric and the results of testing tools (K3) Electricity Based on Internet of Things (IoT). Photos to document the results of research in the form of images.

b. Data source

1) Primary

Primary data collection is data obtained directly from respondents' information through measurements, interviews, and observations. Data obtained through questionnaires by interview include age, level of education, work experience, planning, organization, actuating, controlling, Monitoring in the application of K3 Electric, and the results of testing tools (K3) Electricity Based on the Internet of Things (IoT).

2) Secondary

Secondary data is data obtained from a general description of the research location, the number of technical personnel, or employees who are directly related to electricity in hospitals, books, scientific journals, and the internet.

c. Data Collection Methods

Data collected include age, level of education, work experience, planning, organization, actuating, controlling, Monitoring in the application of K3 Electric by interviewing all respondents aiming to find out the age of the respondent, the latest education level, experience / long drive, knowledge and behavior of respondents towards K3 Electric in carrying out work.

III. RESULT AND DISCUSSION

Internet of Things (IoT) is a concept/scenario where an object can transfer data through a network without requiring human-to-human or human-computer interaction. "A Things" on the Internet of Things can be defined as a subject, for example, a person with a heart im-plant monitor, a farm animal with a biochip transponder, a car that has a built-in sensor to warn the driver when the tire pressure is low. So far, IoT is most closely related to machine-to-machine (M2M) communications in manufacturing and electricity, oil, and gas. Products are built with M2M communication capabilities which are often referred to as "smart" systems. (example: smart label, smart meter, smart grid sensor).The term IoT (Internet of Things) began to be known in 1999 when it was first mentioned in a presentation by Kevin Ashton, co-founder and executive director of the Auto-ID Center at MIT. With the development of internet infrastructure, we are going to the next round, where not only smartphones or computers can be connected to the internet. But a variety of real objects will be connected to the internet. For example, it can be production machinery, cars, electronic equipment, equipment that can be worn by humans (wearables), and including any tangible objects that are all connected to local and global networks using sensors and or embedded actuators. (Yudhanto 2007) This research is targeted to obtain results in the form of novelty about the development of protection and the application of the Development of an Occupational Safety and Health Monitoring System (K3) based on the Internet of Things (IoT) in the Electrical Installation of Private hospital in Malang City Malang.

Where Hospital is a hospital that organizes activities of health services, education, research, and community service with the aim other than as a practical health service center is also a research laboratory education application facility.Indonesia must prepare regulations that can facilitate the process of developing and implementing IoT technology. Without regulation, developers do not have a strong legal basis for developing and applying IoT technology that is safe for the community. The word "safe" here means reliable and durable. When the government has clear rules regarding the standardization of IoT technology, the developer

will easily adjust the IoT device to follow the established rules.However, problems will arise if the clarity of regulation on IoT technology is still gray. For example, in the process of developing IoT technology. If the government never sets standards regarding IoT technology in terms of frequency, level of domestic components, and quality, developers will be swayed. Developers will wonder if the IoT devices they make can meet regulations if at any time the government issues IoT technology standards. This also inhibits the growth of IoT technology in Indonesia.Whether on an industrial, government, or individual scale, to take advantage of IoT technology, infrastructure is crucial. How can you feel the sophistication of IoT technology without a stable internet network.

Table 1. Eigenvalue implementation of the internet of thongs

	Eigenvalue	Percentage of Variance	Cumulative
1	29.35061	46.59%	46.59%
2	5.22247	8.29%	54.88%
3	4.23482	6.72%	61.60%
4	2.87343	4.56%	66.16%
5	2.48828	3.95%	70.11%
6	2.19054	3.48%	73.59%
7	1.82233	2.89%	76.48%
8	1.71139	2.72%	79.20%
9	1.63557	2.60%	81.79%
10	1.44966	2.30%	84.09%
11	1.10146	1.75%	85.84%
12	1.03224	1.64%	87.48%
13	1.01422	1.61%	89.09%
14	0.92329	1.47%	90.56%
15	0.79649	1.26%	91.82%
16	0.74234	1.18%	93.00%
17	0.69297	1.10%	94.10%
18	0.59469	0.94%	95.04%
19	0.51217	0.81%	95.86%
20	0.46726	0.74%	96.60%
21	0.44108	0.70%	97.30%
22	0.38832	0.62%	97.91%
23	0.33028	0.52%	98.44%
24	0.26758	0.42%	98.86%
25	0.22876	0.36%	99.23%
26	0.1764	0.28%	99.51%
27	0.1457	0.23%	99.74%
28	0.10315	0.16%	99.90%
29	0.0625	0.10%	100.00%
30	0	0.00%	100.00%
31	0	0.00%	100.00%
32	0	0.00%	100.00%

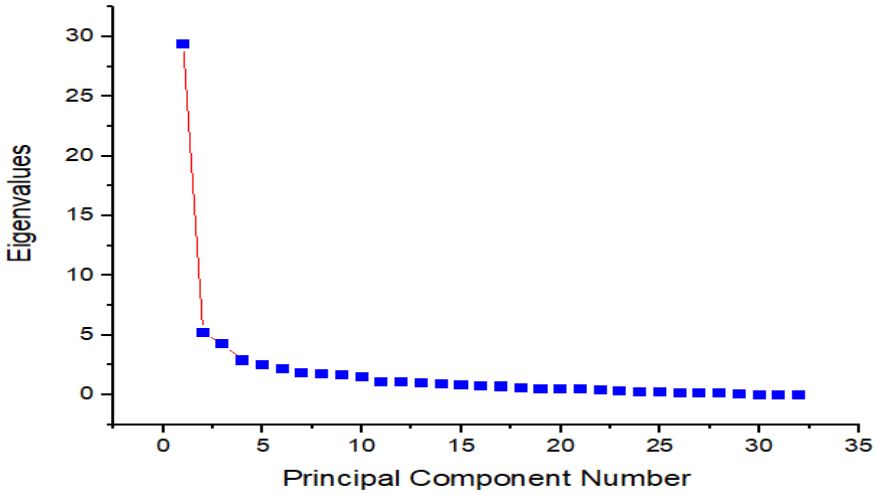
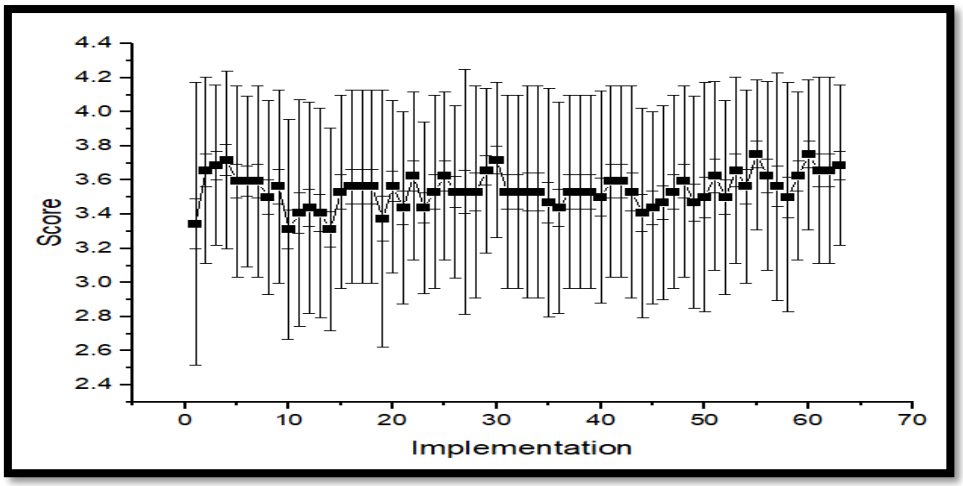


Fig 1. Graph of Eigenvalues for the implementation of the internet of things.

For IoT technology to work properly, interactions between IoT devices and humans or users must work well. The function of IoT will not work optimally if the user cannot operate it properly. No, it's not about making the formula as you did in Excel, but rather using functions such as managing schedules, on/off

devices, and reading digital information generated by IoT technology, with the eigenvalues value approaching 29.4, indicating that the implementation of Monitoring Occupational Health and Safety (OHS) Electricity Based on Internet of Things (IoT) will produce maximum results if implemented in Private hospital in Malang City.Humans/users who have the role to make decisions must be able to read the information that has been processed by the IoT device. If the user cannot read the information properly, it is thinkable that the decision made will be contrary to the expected results. Therefore, preparing human resources for digital literacy has become a necessity. Because again, the digital world is in sight. If you cannot adapt to technology, then don't expect the development and employment of IoT to work properly.



To be able to develop and implement IoT, the habit of using digital devices to complete a task is very necessary. That's because most of the interactions between IoT devices with Users occur in digital form. Expertise in reading digital data to support the decision-making process is also very crucial from the results of the calculation of the implementation of data monitoring of Occupational Health and Safety (OHS) Internet-Based Electricity of Things (IoT) with an average of 3.54, indicating that the majority of workers in Private hospital in Malang City strongly agrees with the application of Internet If Things in the Hospital Environment. And in fact, there is a tendency to inhibit other processes. For example, users are given data about the habits of city communities in traffic. Implementation. Therefore, digital literacy is needed in developing and implementing IoT in Private hospitals in Malang City.

IV. CONCLUSION

- Making plans for the construction of an Electrical Safety and Health Monitoring System based on the Internet of Things (IoT) in the Electrical Installation of Private hospital in Malang City, Malang.
- Conduct internal validity of the Occupational Health and Safety (OHS) Electric Monitoring System based on the Internet of Things (IoT) in Electrical Installation of Private Hospital in Mlang City.
- Conduct external validity of the Health and Safety (K3) Monitoring System based on the Internet of Things (IoT) in the Electrical Installation of Universitas Brawijaya Malang.
- That's because most of the interactions between IoT devices with Users occur in digital form. Besides, expertise in reading digital data to support the decision-making process is also very crucial from the results of the calculation of the implementation of data monitoring of Occupational Health and Safety (OHS) Internet-Based Electricity of Things (IoT) with an average of 3.54, indicating that the majority of workers in Private hospital in Malang City.

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