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Analysis of Infrastructure Usage Among Students in Adopting Education 4.0 At Higher Learning Institution in Johor

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Abstract: Nowadays Education 4.0 promotes education in a novel way, primarily using technology-based tools and resources. However, education in Malaysia still lacks exposure in terms of IoT to students and educators. Therefore, this study aims to determine the level of infrastructures usage among students in adopting education 4.0. It's also aims to determine the level performance in adopting education 4.0 among students and to determine the relationship between infrastructures usage in adopting education 4.0 and performance in adopting education 4.0 among students was be focused on University Tun Hussein Onn Malaysia and University Technology Malaysia. The data obtained was analyzed descriptively and correlated using Statistical Package for Science (SPSS) and Microsoft Excel. This research used an online survey questionnaire like a google form to collect the data from 351 valid respondents. The results show that the level of infrastructures usage influences performance in adopting education 4.0 among students in UTHM and UTM but because of that if level of infrastructure usage had a is increase and level performance among student in adopting education 4.0 increase, so the relationship between them is positive.

Keywords: Education 4.0, Infrastructures Usage, Performance

1. Introduction

Technology began to influence the educational process in the new millennium, and both students and teachers began to use it in significant ways (otherwise known as Education 2.0). Education 3.0 emerged because of technological advancements, particularly the widespread adoption of a more user-generated internet. Because of these tools, students were able to use their own knowledge sources, learn online, and communicate with teachers and other students. Education became more networkable, giving

students their own direct link to a variety of diverse knowledge sources, rather than focusing on a back-and-forth between students and teachers.

The fourth industrial revolution is associated with the "Education 4.0" learning approach, which seeks to change education in the future through automation and advanced technology. This technological revolution includes artificial intelligence, robotics, and smart technology. Each of these influences how we live our lives daily. If universities want to continue producing successful graduates, they must prepare their students for a world in which cyber-physical systems are prevalent throughout all organizations. This includes incorporating technology into the curriculum, fundamentally changing how people study, and using technology to improve the educational experience.

In the advance technology era, Malaysia is not left behind to be one of the developing countries. According to National Integrity Plan (2017), memorandum that expressed by the former prime minister Dato' Seri Abdullah Haji Ahmad Badawi stated that, Malaysia has been successful as a developing country, and it is now on its way on becoming a developed country. However, the Malaysian Institute of Microelectronics Systems (MIMOS) and the Ministry of Science, Technology, and Innovation (MOSTI) jointly released the National Internet of Things (IoT) Strategic Roadmap in 2015 as part of Malaysia's preparation for technological progress, specifically IoT (National Integrity Plan, 2017). Although, Malaysia is one of the developing countries but the implementation of IoT in education sector still on the starting point.

Top 50 key phrases by relevance, based on 87 publications about "Education 4.0" and "teaching", have been addressed to a lesser extent (digital devices, society, and multimodality) and could be topics to which educational research can contribute (Ramírez-Montoya et al., 2021). This shows that, education in Malaysia still lacks exposure in terms of IoT to students and educators. The implementation of IoT among

Digital transformation and Education 4.0 are different from traditional education because they are enabled, supported, and guided by technology, including artificial intelligence, data management, ubiquitous technologies, robots, cloud computing, and sustainable technologies. A 2018 report by PricewaterhouseCoopers (PwC) (Will Robots Really Steal Our Jobs? n.d.) [14] identified that increased training in digital skills and Science, Technology, Engineering and Mathematics (STEM) fields would be required, and soft skills not easily automated by machines, such as creativity and flexibility. Next Up adopted a generic definition for Education 4.0 in higher education institutions as aligning their services and curricula to prepare the future Industry 4.0 workforce with technologies to address critical challenges such as student experience, the skills gap, data management, innovations in teaching and learning, metrics, open science, research, and cybersecurity. (Bonfield et al., 2020)

2. Literature Review

This chapter will focus on the innovative infrastructure to improve learning processes in adopting education 4.0 at higher education institutions in Johor. This chapter is divided into seven sections. First, describe education 4.0. Secondly, to discuss the usage of innovative infrastructure to improve learning processes. In the third segment it is discussed about Education 4.0 in Malaysia. Next, describe the higher learning institution. After that, will discuss higher learning institutions in Johor. Besides that, the importance of education 4.0 at higher learning institution. The last discussion is based on the previous study of the analysis of infrastructure among students in adopting education 4.0.

2.1 Education 4.0

Technology started to penetrate the educational process in the new millennium, and both students and teachers started using it in important ways (otherwise known as Education 2.0). Education 3.0 appeared as technology advanced, particularly with the mass adoption of a more user-generated internet. This allowed students to learn online, communicate with teachers and other students, and access their

own information sources. Education grew more networkable, with students having direct access to several diverse knowledge sources rather than focused on a back-and-forth between students and teachers.

In general, Education 4.0 is an institute of belief that promotes intelligent and smart thinking in education. Education 4.0 promotes education differently, mainly by consuming technology-based tools and resources. This means that students will not learn to use textbooks, pens, and essay teachers in traditional classrooms. Instead, Education 4.0 allows remote students to access the Internet and enrol in courses through a variety of open online courses, video chats, or voice calls to learn more dynamic material about the same students. (Sharma, 2019). Otherwise, Education 4.0 is a learning technique associated with the fourth industrial revolution that focuses on transforming education's future through advanced technology and automation. This industrial revolution included smart technology, artificial intelligence, and robotics. They all have an impact on our daily lives. If universities are to continue producing successful graduates, they must prepare their students for a world in which cyber-physical systems are ubiquitous across all industries. This includes incorporating technology into the curriculum, completely changing the learning process, and leveraging technology to improve the university experience.

2.2 Infrastructure

Infrastructure is defined as the sum of material, institutional and personal facilities and data which are available to the economic agents, and which contribute to realizing the equalization of the remuneration of comparable inputs in the case of a suitable allocation of resources, that is complete integration and maximum level of economic activities.

Learning environments in Education 4.0 are supported by suitable infrastructures for learning and teaching practices that accommodate students' learning needs and support current educational challenges related to teaching and management activities. Consequently, innovative virtual and physical infrastructures are emerging in response to current needs and challenges.

2.3 Element of Infrastructure

There are two levels proposed to describe the currently used infrastructure in higher education at the classroom level and at the institutional level.

(a) Classroom level

Class-level. This level prioritizes providing the classroom with modern furniture, linked equipment, and other pedagogical and instructional tools. Designing learning spaces is another significant classroom issue since certain design elements improve student learning.

Thus, pedagogy and psychology have proven that classrooms, collaborative spaces, learning commons, and libraries may be altered with appropriate architecture, colors, illumination, sounds, and temperature to increase learning. Libraries, learning commons, and collaborative spaces are examples. These sectors may also have virtual and digital resource interface technology. Holograms, virtual and augmented worlds, and hologram systems are examples.

Learning spaces are also assessed for comfort, cooperation, and recreation. This includes students, educators, and staff using their houses as classrooms with specialized infrastructure. This includes homeschooling. These infrastructures include internet access, networked gadgets, and customized furnishings. IoT gadgets serve travelers better than Google Maps and other navigational services. Electromagnetic waves connect proximity sensors and smart devices, not GPS. These sensors also protect children. Wearable technology lets parents use telephones to find their kids in public.

(b) Institutional level

At the Level of the Institution. At this level, consideration is given to making use of the resources (facilities, services, and systems) that are available inside an educational establishment. Other than that, not just educational procedures but also management procedures and service procedures are taken into consideration when designing this infrastructure. Nowadays, establishments create areas for improved learning settings, and only students and teachers are affected by these factors, but also those who work together inside an organization institution.

Because of this, the infrastructure of an educational institution also incorporates recreational opportunities, comfortable spaces, environmentally responsible practices, and accessibility. In the year 2020, as a direct consequence of the widespread health crisis caused by the coronavirus, the majority of educational institutions were forced to adopt virtual and digital infrastructures in order to develop their competencies and capabilities and provide academic continuity even when they are not physically there.

These Infrastructures consist of information and communications technology platforms that support web- conferencing and learning management systems through their use of connectivity, digitization, and virtuality capabilities. There has been a proliferation of services, some of which include online libraries, instant messaging platforms, and remote laboratories enabled and frequently employed.

2.4 Education 4.0 in Malaysia

According to Dunwill (2016), technological advancements continue to change and transform both the teaching approach and the learning environment. In reality, future changes will be more pronounced. Lecturers posting student grades and assignments online, students using group collaboration software or applications to complete group tasks, students completing their assignments online and uploading them to an online class portal or the educational institution's learning management system, students' high reliance on cloud storage to store their work, and communication between students, parents, and teachers are some of the frequent changes adopted by educational institutions. According to Dunwill, virtual and augmented reality will change the educational landscape, flexible assignments will accommodate different learning styles, and MOOCs and other online learning options will have an impact on secondary education (2016). This represents a significant change in the layout of a typical classroom. Dunwill (2016) focuses on the changes to secondary education's teaching strategy and environment that will take place over the next five to seven years. Malaysia's tertiary education system has previously undergone a similar transition.

The design of the classroom has gradually evolved from neat rows of chairs to a flexible seating arrangement that allows for both individual and group workspaces. Assignments for students are no longer simply constructed or selected responses. Alternative assessments have been introduced to accommodate multiple learning styles. Portfolios, project papers, skill demonstrations, and rating systems are examples of alternative exams used today. Massive Open Online Courses (MOOCs) and other online learning platforms, as well as changes in classroom design and assessment methods, are now being used in tertiary education. Most MOOCs offered by reputable academic institutions in Malaysia are free. Students may take whatever courses they are interested in.

Many courses are self-paced, allowing students to learn from anywhere and at any time using their own devices. Finally, many tertiary education instructors in Malaysia appear to be unfamiliar with Dunwill's (2016) final forecast on the use of virtual reality (VR) and augmented reality (AR) in teaching and learning. Teachers can now incorporate virtual and augmented reality into their lessons thanks to the development of user-friendly VR and AR apps.

2.5 Higher Learning Institution

A college, university, or other similar institution, such as a technical or business school, is considered a "institution of higher learning" if it offers postsecondary academic instruction leading to

an associate's or higher degree and is authorized to do so by the relevant State education authority in accordance with State law. Public and private institutions of higher learning are divided. In contrast to private universities, public universities are those that receive the majority of their funding from the public sector through a national or subnational government. The definition of "public" differs from nation to nation, usually dependent on the particulars of the educational system. Public universities are frequently among the most significant research institutions worldwide and typically have a stronger domestic reputation in some parts of the world. Furthermore, government funding is provided to public universities. The university receives significant funding from the state or federal governments, so it is not dependent on students' tuition fees to sustain it. Additionally, public universities and colleges have large class sizes with hundreds of students. There will be a lot more students enrolling at the university overall. The Penn State University, which has close to 40,000 undergraduate students, is an illustration of a sizable public university.

Institutions of higher learning, private universities and colleges are not operated, owned, or institutionally sponsored by governments. They may receive tax breaks, grants, and public student loans from the government, which they frequently do. Private universities could be governed by the government, depending on their location. Public universities and national universities can be contrasted with private universities. Lots of private universities are charitable institutions. Additionally, private institutions tend to be smaller due to more selective financing sources, which frequently results in fewer students and smaller class numbers. Consequently, there will be fewer instructors, majors, and degrees. Private institutions, on the other hand, frequently attract students from around the county since they do not charge in-state tuition. Due to fewer students vying for the same possibilities, smaller private universities may offer more options for students wishing to participate in sports or the arts.

2.6 Higher Learning Institution in Malaysia

The educational system in Malaysia is divided into two sectors: the public sector and the private sector. Malaysia's higher education system is well-organized. The government of Malaysia, which is represented by the Malaysian Ministry of Education, controls the public sector as the first sector. Public institutions are classified into three groups, according to Education Malaysia Global Services (2021), which include public colleges, polytechnics, and community colleges. There are currently 20 public universities in Malaysia, which are grouped into three categories: research universities, targeted universities, and comprehensive universities. Public colleges, community colleges, and polytechnics all provide certificate and diploma programs to their students. Second, the sector is the private sector, which comprises 15 private institutions of higher learning, including 47 private universities (StudyMalaysia.com, 2020). Regarding the level of the programs, they provide and the size of their campuses and infrastructure, private colleges and public universities are very similar. While compared to private universities, the private university college has a smaller campus and fewer students. University colleges place a greater emphasis on undergraduate programs only. Malaysian education also has other institutions like foreign universities, overseas campuses, and language centers in addition to private sector institutions that are not government-run. The university that has foreign branches in Malaysia are based on partnership between Malaysian institution and other overseas universities such as United States, United Kingdom, Australia, and Ireland (Education Malaysia Global Services, 2021).

Malaysia's educational system, as a developing country, is moving toward education 4.0. According to Ministry of Education Malaysia (MoE) (2015), the Malaysian Ministry of Higher Education (MoHE) developed the MEB (HE) program with the goal of aligning the Malaysian educational system with technological innovation (Maria et al., 2018). This plan was developed to modernize Malaysia's high school curriculum and produce balanced learners who value both knowledge and skills as well as ethics and morality (Maria et al., 2018). The blueprint's two purposes are divided into three key points for each. There are three major areas of focus for ethics and morality: ethics and spirituality, leadership

skills, and national identity. While the main point under the second purpose of the blueprint, knowledge, and skills, is language proficiency, thinking skills, and knowledge.

Additionally, to improve the educational systems in Malaysia, the Ministry of Education Malaysia (MoE) (2015) developed additional programmes including CEO@faculty, 2u2i, and Massive Open Online Courses (MOOC). The CEO@faculty programmed invite CEOs from any local or foreign company to speak to university students, professors, and all other institutions in Malaysia in order to inform them, particularly students, about the employment environment. The time allotted to CEOs is roughly 30 hours each year. This program's major goal is to connect and involve university students with academics and industry based on their shared industry fields. In order for university students to successfully apply the knowledge they learn at the institution to their industrial field, this programmed must be implemented. This is since they gained a thorough understanding of the workplace during their session. Next, "2 years of study + 2 years of industrial training" is what the 2u2i curriculum stands for (Maria et al., 2018). The 2u2i programmed exposes students to a real-world industrial setting so they can obtain experience in the workplace. The MOOC programmed is currently the most and most used at the higher education level in Malaysia. It allows students and lecturers to put together and provide the resources needed for the learning process, hence reducing the need for textbooks.

2.7 The Importance of Education 4.0 in Higher Learning Institution

Education 4.0 seeks to improve upon the shortcomings of traditional teaching and learning methods. The primary responsibility for learning will change from teachers to students under Education 4.0. Over the next few years, classes will become more adaptable to different learning styles. The importance of education 4.0 in higher education institutions supports a student-centric approach that gives students the freedom to select the courses they want to take. Each learner will also have a unique learning experience. Before they can advance to the next level, they will also need to have a specific level of expertise. Additionally, students will be given the choice of which learning resources they choose. Also, the learning process will be more project-based for students to help them develop time-management or interpersonal skills to make them job-ready. additionally, altering instructional strategies. The inventive ways in which teachers can enhance teaching and learning will be improved through education 4.0. To increase teachers' performance, the report recommends strengthening teacher preparation. A comprehensive approach for improving teacher capacity that integrates training with career development is being designed with input from teachers as well.

As part of education 4.0, the emphasis will be placed on practical and experience learning-based projects or field work that are appropriate for future employment, rather than just relying solely on tests. Education 4.0, according to Hariharasudan & Kot (2018), "actually alters" the conventional exam-taking procedures. Instead, then being evaluated primarily on their ability to memorize information, students are evaluated in real-time according to how they do while working on field projects. According to Marshal (2002), the impact of technology on the education sector should be used to change not only how knowledge is delivered to students, but also how students view education.

In comparison to the conventional methods of learning, which include studying textbooks, Education 4.0 also connects a learner to achieve a deeper connectivity. According to research by Diwan (2017), today's learners might easily become bored because they are continuously seeking out exciting visual and audio cues. The use of education 4.0 enables all students to encounter a visual component that successfully strengthens the relationship between concepts learned and knowledge (Halili 2019). This was particularly clear in the 1990s, when augmented reality and virtual reality were being used in everyday life. Because this technology offers an indirect view of a real-world setting with greater sensory inputs and graphic features, the usage of augmented reality and virtual reality has increased student interest in studying.

2.8 Previous Study

The findings are consistent with previous research (Finger & Trinidad, 2002; Jorge et al., 2003; Young, 2003; Jamieson-Procter et al., 2013). Instead of relying solely on textbook material, students, according to the author, get to explore more knowledge and information. According to the author, this was demonstrated when virtual reality and augmented reality were used in practical ways that increased student engagement because technological advancements provide them with a glimpse of the real-world environment. Furthermore, students in a technology-based course are exposed to more hands-on activities that will develop their understanding and knowledge of the subject, while teachers can design their lesson plans in a more effective and engaging manner, which has a significant positive impact on a student's active learning. Technological advancements, from the perspective of the lecturer, allow for the expansion of the teaching process and the development of a student's learning through collaborative learning, as previously described by (Aziz Hussin, 2018)

Teachers that possess these skills can improve student learning results and encourage their creativity and innovation, according to Brown Martin (2018). In a sense, teachers have the privilege of creating skilled professionals who are highly competent in technical skills, social skills, interdisciplinary thinking, as well as problem-solving techniques for a technologically driven, virtualized, and highly globalized workplace, as opposed to simply producing trained and qualified professionals.

"Seeking to graduate a new generation of highly competitive professionals capable of deploying the necessary physical and digital resources to provide innovative solutions to current and future societal challenges" is what Miranda et al. define as "Education 4.0," according to Miranda et al. Additionally, the idea of "Education 4.0" has been used to develop and put into reality creative educational techniques. In this situation, educational innovation aims to find the "best practices" of active learning and relies heavily on technical tools to put them into effect.

According to Lawrence (2019), students benefit from using technology and devices to further their education. The methods and resources that students want to use to learn this information are their own. An excellent illustration of this are methods like blended learning, BYOD (Bring Your Own Device), and flipped classrooms, which combine campus-based and online learning on a module-by-module basis.

2.9 Conclusion

The literature review is concerned with prior researchers' studies that will be used as a reference for this investigation. This is important because the researcher will learn the research procedures to gather relevant data as well as evaluate and value the findings of past studies based on these previous studies. The study covers the analysis of infrastructures among students in adopting education 4.0 in this chapter. Both educators and students will have a good impact with the development of education 4.0.

3. Research Methodology

Methodology is one of the elements that are important in conducting research. It gives the appropriate guidance in achieving the research study objectives. Therefore, methodology helps to make research process effective in collecting and analyzing the data systematically for achieving research objectives.

3.1 Research Design

In this research, the method that is used to conduct the analysis is quantitative research where we wanted to know the correlation between the objective. Quantitative research is the method to generate numeral data and transform it to statistical results. The approach will focus on the data collection from the problem of large population and analyses the data while ignoring the emotions of the person and the environment of it (Rahl, 2017). The data gathering procedure will use survey formats such as questionnaires, online surveys, and mobile surveys, among others. Therefore, the main focus of this

study will be on the questionnaires provided to respondents in order to gather data and meet the research goals.

3.2 Research Population and Sample

In this research, the target population will be public universities students from Johor, which is Universiti Tun Hussein Onn Malaysia (UTHM) and University Teknologi Malaysia. (UTM) The population of UTHM students is around 16,700 (UTHM, 2016). The population of UTM students is around 15,200. (UTM 2022) The data is obtained from the official websites of the universities. The size of the sample in this research will be determined by referring to the Krejcie and Morgan table. According to (Krejcie & Morgan, 1970) the sample size of this study is 375 students from UTHM and UTM.

3.3 Data Collection

Data collection is vital to ensuring that the research process works well and that the study goals are met. It is the process of gathering data from appropriate sources, testing hypotheses, and evaluating the results. In this study, there are two categories of data: primary and secondary.

3.4 Pilot Study

This study's questionnaire was based on prior research and literature reviews. Thus, before distributing questionnaires, a pilot test will determine their validity and reliability and in reliability tests, only a small percentage of the population is selected as respondents. The researcher limited the reliability test to 30 students.

3.5 Research Instrument

The research instrument is a method used to collect, evaluate, and analyze data from subjects related to the research topic. In this research study, a questionnaire is used as the data collection instrument.

(a) Questionnaire

The questionnaire is the instrument that includes a series of questions with the purpose of collecting information from respondents. The data collected from the questionnaire were used to determine the analysis usage infrastructures among students in adopting education 4.0 and the challenges in adopting education 4.0. The questionnaire was divided into two parts, Part A and Part B. Part A will be the demography of the respondent and part B will deal with education 4.0 in higher level institution to achieve research objective one. Table 1 shows five-point Likert scale.

Table 1: Five-point Likert Scale

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3.6 Data Analysis

In this research, descriptive statistics were used to make sense of the information gleaned from the questionnaires participants filled out. The process of simplifying, summarizing, and organizing the numerical data is referred to as descriptive analysis. Statistical Package for the Social Sciences (SPSS) and various forecasting techniques are the types of software that are utilized during the data analysis process.

3.7 Summary

In conclusion, the research methodology that was applied throughout this research was the quantitative method. To accomplish the first goal of the research, the use of the questionnaire to collect primary data was necessary and to accomplish the second research goal, secondary data drawn from a wide variety of sources will be utilized. Last but not least to conduct an analysis of the information that was gathered, the descriptive analysis method was utilized.

4. Results and Discussion

In this chapter, the analysis of data and discussions regarding the results obtained from the questionnaire distribution will be presented in the section below. The purpose of the data analysis is to answer the research questions and research objectives and supported by the results of research. The data collection is interpreted by using Statistical Package for Social Science (SPSS) software version 27 and Microsoft Excel.

4.1 Descriptive Analysis (Independent variable)

This section is to answer the research questions which is to determine the level of infrastructure usage among students in adopting education 4.0 among students. In this study, consists of 5 Likert Scale questions of performance in adopting Education 4.0. The output gain from the data has been analyzed into descriptive analysis. There are four components to measure the performance in adopting Education 4.0 methods among students. The components are "use online platform", "using IOT devices", "using smart learning laboratories" and lastly "using virtual classrooms with web conferencing".

Table 2: Descriptive analysis of the infrastructures

No	Infrastructure	Mean	Standard Deviation
1.	I use online platform for adopting education 4.0.	4.29	0.85
2.	I am using IOT devices for adopting education 4.0.	4.13	0.98
3.	I use smart learning laboratories to understand the learning process in adopting education 4.0	4.09	0.96
4.	i using virtual classrooms with web-conferencing for adopting education 4.0	4.23	0.90
	Cumulative average	4.18	0.92

Table 2 showed the descriptive analysis of the infrastructures. In infrastructures among students" ability student to adapt online platform for adopting education 4.0 got the highest mean by 4.29 meanwhile the second highest mean score by item no. 4 with using the virtual classroom with web conferencing for adopting education 4.0 with 4.23 Moreover, item no 2 is nearest to the mean value of item no 3 who got the lowest value mean.

4.2 Descriptive Analysis (Dependent variable)

Table 3: Performance on adopting education 4.0.

No.	Performance on adopting education 4.0	Mean	Standard Deviation
1	I can usually find ways of applying what I'm learning in class to something else in my life.	4.25	0.82
2	I am learning a lot in most of my classes this semester.	4.21	0.90
3	I often discuss with my friends what I'm learning in class.	4.18	0.89

4	I usually think about how the topics being discussed in class might.	4.30	0.84
	be connected to things I have learned in previous class periods.		
5	I am learning about a new idea in a class, I think about how I	4.24	0.84
	might apply it in practical ways.		
6	Sometimes I get so interested in something I'm studying in class.	4.23	0.89
	that I spend extra time trying to learn more about it.		
7	I regularly participate in class discussions in most of my classes.	4.12	0.89
8	Sometimes I am afraid to participate in class.	2.86	1.50
9	Often, I find my mind wandering during class.	3.10	1.45
10	It's hard to pay attention in many of my classes	2.93	1.45
	Cumulative Average	3.84	1.05

Table 3 indicated the descriptive analysis for performance in adopting education 4.0 among students in UTHM and UTM only. The table shows the 10 items in this group with their mean and standard deviation respectively. This part will elaborate the highest mean that scored by item no. 4, they "usually think about how the topics being discussed in class might be connected to things that they have learned in previous class periods" which scored the highest mean which is 4.30. Meanwhile, for the lowest mean is respond on the item no. 8 that scores only 2.86 that state "sometimes they afraid to participate in class" among the 9 other item. On the other hand, the highest and third highest score by the item no. 1 and no. 5 that stated, "I can usually find ways of applying what I'm learning in class to something else in my life" and "I am learning about a new idea in a class, I think about how I might apply it in practical ways" with both item scored mean by 4.25 and 4.24. Other than that, item that scored above 4 is item no. 2,3,6 and 7 which is scored by 4.21, 4.18, 4.23 and 4.12. Meanwhile there is single item that score only 3.10 that is stated no. item no. 9 and the rest of it only score by the mean score 2.93 which is item no. 10 and item no. 8 that scored only 2.86. Finally, the total cumulative average for all Performance on adopting education 4.0 among student is score by 3.84.

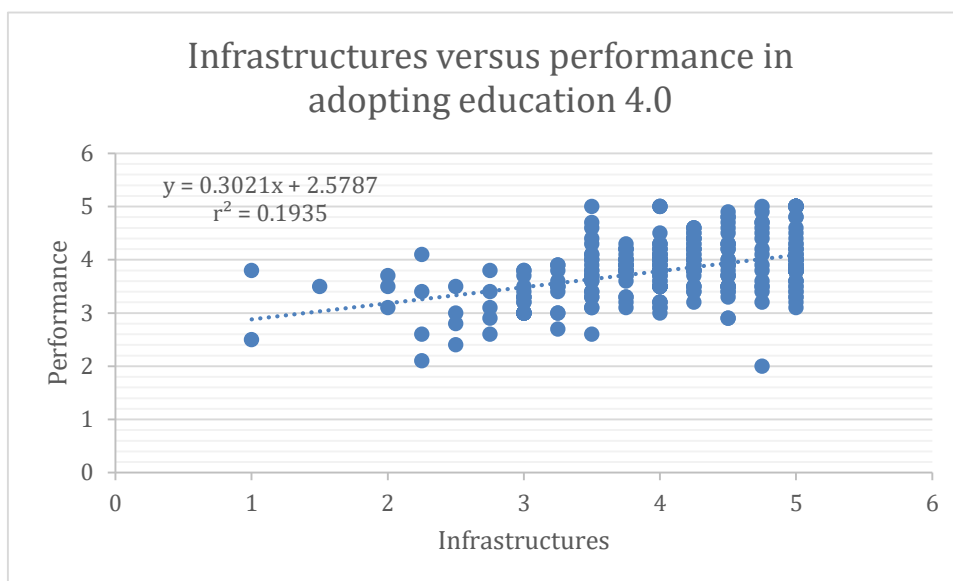### 4.3   Correlation and Regression analysis (Infrastructures)

Figure 1: Correlation between Infrastructures versus performance in adopting education 4.0.

Based on Figure 1 above shows the correlation between analysis of infrastructures and performance in adopting education 4.0 among students from UTHM and UTM. The Pearson's correlation of coefficient, r = 0.439 (-0.4 ≤ r < 0.4). There is a correlation between analysis of infrastructures and performance in adopting education 4.0. The equation of regression line is y = 0.3021x + 2.5787. As analysis of infrastructures increases, the performance in adopting education 4.0 among students increases. Particularly, the level of analysis of infrastructures increases by 1 unit, the level of performance in adopting education 4.0 increases by 0.3021 units. The correlation of determination is r2 = 0.1935. This shows only 19.35% of the total variation is explained or accounted for by the regression line.

5. Conclusion

In conclusion, the purpose of this research is to determine the level of Infrastructures usage among students, determine the level of performance in adopting in education 4.0 among students and to determine the relationship between Infrastructures usage in adopting education 4.0 and performance in adopting education 4.0 among students in UTHM and UTM. The developed research questions and objectives have been achieved after all the research process went through.

In this research, the method that has been used to conduct the study is quantitative. The respondents are students from University Tun Hussein Onn Malaysia (UTHM) and Universiti Teknologi Malaysia (UTM), in which the target respondents are 379 but the students that answer the questionnaire is only 351 respondents. Thus, the data are gathered to be used and analyzed in this study. According to the findings, the more level of Infrastructures usage in adopting education 4.0, the higher of the level of performance in adopting education 4.0 among students in UTHM and UTM. Thus, the Infrastructures usage in adopting education 4.0 has influence on the performance of education 4.0 among students in UTHM and UTM. The implementation of Infrastructures usage in adopting education 4.0 in higher education sector is crucial, in order to produce graduates who are proficient in the use of technology. This is because career opportunities are more to digital age. Thus, the use and creation of new technologies can be developed, then the level of IoT is comparable and can compete with other developed countries.

Finally, the results gained have been discussed in a further way. To ensure the implementation of Infrastructures usage in adopting education 4.0 growing continuously in higher education institutions,

the intervention from government and other important parties are crucially needed. Thus, suggestions for future studies have been proposed to enhance the reliability and validity of the collected data.

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