International Journal of Engineering & Technology, 7 (4.29) (2018) 216-218

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

The Effect of Internet of Things (IoT) Towards Social Sciences Student's Performance

Farahwahida Mohd[1], Norsila Shamsuddin [2], Puzziawati Ab. Ghani[3]

[1]*Malaysian Institute of Information Technology, University Kuala Lumpur, Malaysia*
[2]*Faculty of Education and Social Sciences, Universiti Selangor, Malaysia*
[3]*Faculty of Computer & Mathematical Sciences, Universiti Teknologi MARA, Malaysia*
**Corresponding author E-mail:farahwahidam@unikl.edu.my*

Abstract

This study is to evaluate the effect of IoT towards social sciences student's class performance. This is to measure whether IoT contribute to their performance or not. It is found that e-learning modules are most preferred by the students as compared to blended learning and conventional face-to-face learning environment. E learning was ranked as number 1 most prefer method followed by blended learning and the least preferred is the conventional method that is face-to-face classroom environment. Furthermore, competency in using IT devices such as smart phones, tablet, wi-fi dongle and etc is an advantage in this new era of technology and very significant towards the students' performance (p-value = 0.000). Followed by awareness of the usage of IoT (p-value = 0.011), importance of the devices in contributing good performance (p-value = 0.015) and finally yet importantly usefulness of IoT have significant effect towards performance. All variables are significant at 5% level of significant. Therefore, we can conclude that IoT does give significant effect towards these Social Sciences Students' performance in all of their activities in the university.

Keywords: *IoT, Internet of Things, performance*

1. Introduction

We are bind by many of the things arranged in the system of different network settings, which we call them as Internet of Things (IoT) (J. Gubbi, et al., 2013). These types of organisation of devices are connecting towards ubiquitous computing and smarter learning arrangements. According to F. Terroso-Saenz, et al., (2017) most of the IoT research findings indicates that small devices connected to the internet in buildings will be the norm in the near future.

Devices such as Smartphone have the capabilities of containing potential applications in numerous fields. In this era, distinctive Smartphone has equipped with an array of embedded sensors such as GPS, accelerometers, gyroscopes, RFID readers, cameras, and microphones along with different communication interfaces namely Cellular, WiFi, Bluetooth, and etc. Thus, a smartphone is a significant benefactor for sensory data that anticipate exploitation in many applications (F. Al-Turjman, 2017).

IoT can influence the education process right from early childhood education, primary and secondary schools and up to tertiary education. Most affected by these technologies are those in higher education (J. Flynn, 2014). Universities students are rapidly change from paper books to e-books. Now, all data gathering are at their fingertips, where the students can study at their own speed. They also have the same experience in learning something regardless from their homes or in the classroom (I.D. Beatty, et al., 2009).

Despite the fact that this practice helps to increase the convenience for students, it also makes the teaching and learning process becomes more efficient for lecturers as well. With these technologies, lecturers do not need to evaluate students' tests on paper (M.K. Tallent-Runnels, et al., 2009). Devices that connected to the cloud allow lecturers to gather information about their students and then determine which students need the most individual attention and care regarding their studies (B.P. Woolf, 2010). Lecturers can design proper lesson plans for those who are weak as well as the excellent students for future classes.

The objective of the study is to evaluate the effect of IoT towards social sciences student's class performance. This is to measure whether IoT contribute to their performance in class or not. The study also evaluated the students' perception on the learning environments through two instruments, which are survey questionnaire and students' comments. The students tend to use their mobile devices in the classroom and has been using the Smartphone to take notes, checking class schedule as well as doing research. These students found out that there are more advantages in using Smartphone compared to the conventional method of studying. With the technologies the students will perform well in class as the information that they gather are at their fingertips.

Copyright © 2018 Authors. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

2. Problem Statement

Conventional method such as teacher-centered teaching and learning is the most common teaching behavior applied in Higher Education Institutions (HEIs) worldwide. This methodology can be very effective in delivering information, motivating students' interest in the information, and teaching them who learn best by listening. However, it shows several challenges because not all learners learn best by listening. Maintaining students' interest is often difficult and complicated. Moreover, the approach tends to require less critical thinking assuming that all students learn in the same manner.

Lack of monitoring system of the lecturers and students whereabouts, keeping track of progress on assignments and projects submission, and administration of lecturers and students academic and non-academic activities are some of the problems arise while using the old-school method. These conventional methods somehow consume so much time in delivering knowledge and sometimes do not meet the objective of a success management.

Higher Education Institutions (HEIs) facilities can have a huge impact on both lecturer and student outcomes. HEI facilities affect lecturers' recruitment, retention, commitment, and effort. It also affects students' health, behaviour, engagement, learning, and growth in achievement. Without adequate facilities and resources, it is extremely difficult to serve large numbers of students with complex needs.

Policymakers, educators, and business people focused on the need to ensure that students learn 21st century skills such as teamwork, collaboration, effective communication, and other skills. Older buildings are not contributing to the teaching of 21st century skills. There is a need to redesign seating arrangements to facilitate various modes of teaching and learning and the use of technology in the classroom as a mode of teaching and learning.

3. Methodology

This study was conducted at Faculty of Education and Social Sciences, Universiti Selangor. The respondents were Education students from Year 1 Diploma in Education (Pre School Studies) students. There are 30 of them taking part in this research.

There were three different learning environments involved in this study. They are conventional method, which is face-to-face teaching; the second method was using e-learning environment, which is more than 80% hours of teaching is using web modules and the third method is using blended learning, which is 50% using face to face and 50% use web modules. As for blended and e-learning environment, students used their smart phones for all of their academics and non-academic activities.

All activities use connected devices to monitor the students, lecturer, and resources and equipment at a reduced operating cost. These tracking capabilities should also lead to safer campuses, as the students would be able to keep track of connected activities and adjust their schedules accordingly; wired and wireless technologies need to implement QoS technique.

A set of questionnaire were given to the students in order to gather information on student's awareness of the new learning environment, student's perception on the usefulness and the importance of the new learning method, and student's competency in using the devices and applications of the new learning methods both blended and e-learning.

Students were given one test on the course taught after 2 weeks of conducting the lecture using the three different teaching methods. It is to evaluate their performance in understanding the course content.

Students are also were asked to rank 1, 2 and 3 according to their preferences of teaching method among the three learning environment that motivates them and increase their interest in studying the course.

4. Analysis and Result

The following tables are the output from SPSS to evaluate the descriptive and inferential analysis on the effect of IoT towards student's performance.

Table 1: Respondent's Gender

Gender	Frequency	Percent
Male	16	53.3
Female	14	46.7
Total	30	100.0

The sample consists of 53.3% (16) males' students and 46.7% (14) females' students from Year 1 Diploma in Education (Pre School Studies), Faculty of Education and Social Sciences, Universiti Selangor.

Table 2: Mean Scores for Test 1

	N	Mean	Std Dev
F2F	30	6.067	1.099
BL	30	7.533	0.726
EL	30	8.067	0.614

F2F – Face to Face
BL – Blended Learning
EL – E-Learning

From Table 2 above, it indicated that the mean score for Test 1 in e-learning module was the highest test scores among other methods, which is blended learning and face-to-face environment. This shows that E-learning was able to contribute in improving student's performances. This also conclude that the students had successful understood the course content through accessing e-learning modules compared to the other two learning methods.

Table 3: Scores for Preferences

	Sum	Rank	
F2F	67	3	
BL	58	2	
EL	49	1	

Table 3 signifies that E-Learning were most preferred by the students in terms of motivating them and increased their interest in studying the course, second preferred is blended learning and the third preferences are face to face learning environment. Again, here, it shows that the students really prefer the e-learning method.

Table 4: t test on IoT

	Mean	Std Dev	Sig (p-value)
Awareness	4.7	1.136	0.011
Usefulness	4.5	0.964	0.021
Importance	5.0	1.980	0.015
Competent	4.2	1.838	0.000

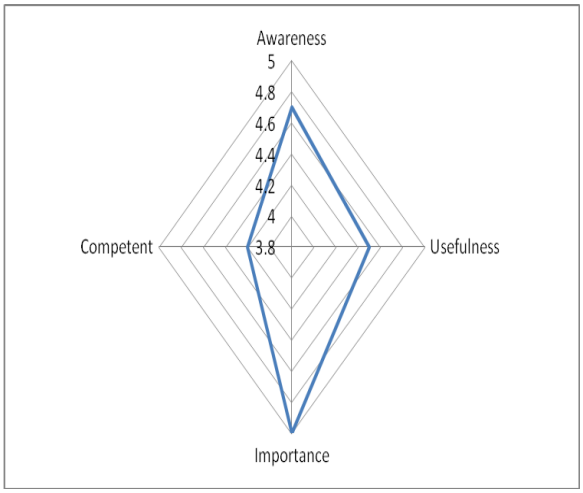

Fig.1: IoT Usage

Based on the above table and Figure 1, it shows that competency in using IT devices such as smart phones, tablet, wi-fi dongle and etc is an advantage in this new era of technology which is very significant towards the students' performance (p-value = 0.000). They agreed that competency is one of the factors that contribute to the successful of engaging with IoT.

Followed by awareness of the usage of IoT (p-value = 0.011). The students agreed that the awareness of using the IoT also contribute to the increment of their class performance.

The importance of the devices is also significant in contributing good performance (p-value = 0.015) and the students are strongly agreed to the statement and finally yet importantly usefulness of IoT have significant effect towards performance (p-value = 0.021) and students agreed to that. All variables are significant at 5% level of significance.

5. Conclusions and Future Work

In the era of technology, people took opportunities and initiatives to advance themselves. With the existence of this unlimited world of the internet, all activities are using smart phones and other devices. This study concentrates on students from Year 1 Diploma in Education (Pre School Studies), Faculty of Education and Social Sciences, Universiti Selangor.

The outcome from the mean test scores conclude that the students had successful understood the course content through accessing e-learning modules compared to the other two learning methods. It signifies that E-Learning technique is more preferable by the students in terms of motivating and increases their interest in studying the course.

The four factors that contributed in this study namely competency, awareness, importance and usefulness showed the significant effect towards Social Sciences Students' performance. Competency of using the devices and application is one of the factors that contribute to the successful of engaging with IoT (P-value=0.000). Followed by awareness of the usage of devices (p-value = 0.011). The students agreed that the awareness of using the internet activities also contribute to the increment of their class performance. The importance of the devices is also significant in contributing good performance (p-value = 0.015) and the students are strongly agreed to the statement and finally yet importantly usefulness of internet applications have significant effect towards performance (p-value = 0.021) and students agreed to that. All variables are significant at 5% level of significance.

Working from student information can help lecturers to both track and expand student progress, and to comprehend which instructional practices are effective in their learning experiences. The lecturer can analyze their student's evaluation information to distinguish the strengths, shortcomings and to set new learning objectives by collaborating with each other using IoT based infrastructure and services.

Further research is required in this field with the specific aim of verifying these results for different types of online courses, as well as for classroom-based courses and the approaches leading to innovative ideas. A step forward is required in the assessment of the relationship between the progressive structures of teaching and learning in universities. Consolidating diverse information sources to make claims about student learning is well established and loaded with challenges in assessment (D.C. Frezzo, et al., 2009) and when applied to high-stakes activities, it must meet proper standards for objective student assessment. This could contribute towards the attainment of learning outcome for the courses.

Acknowledgements

This work is not supported by any grant from Institution.

References

[1] B.P. Woolf, Building Intelligent Interactive Tutors: Student-Centered Strategies for Revolutionizing E-Learning, Morgan Kaufmann, 2010.
[2] D.C. Frezzo, J.T. Behrens, R.J. Mislevy, Design patterns for learning and assessment: facilitating the introduction of a complex simulation-based learning environment into a community of instructors, J. Sci. Educ. Technol. 19 (2) (2009) 105–114.
[3] F. Terroso-Saenz, et al., An open IoT platform for the management and analysis of energy data, Future Generation Computer Systems (2017), http://dx.doi.org/10.1016/j.future.2017.08.046.
[4] F. Al-Turjman, 5G-enabled devices and smart-spaces in social-IoT: An overview, Future Generation Computer Systems (2017),https://doi.org/10.1016/j.future.2017.11.035.
[5] I.D. Beatty, W.J. Gerace, Technology-enhanced formative assessment: A research-based pedagogy for teaching science with classroom response technology,J. Sci. Educ. Technol. 18 (2) (2009) 146–162.
[6] J. Flynn, The effect of mobile phone attachment on an attention task among secondary school and college students, Bachelors Final Year Project, Dublin Business School, 2014.
[7] M.K. Tallent-Runnels, et al., Teaching courses online: A review of the research, Rev. Educ. Res. 76 (1) (2006) 93–135.
[8] M. Domingues, A. Radwan, Optical Fiber Sensors for loT and Smart Devices, in: Springer Briefs in Electrical and Computer Engineering, March 2017, http: //dx.doi.org/10.1007/978-3-319-47349-9.
[9] S.R. Hall, A.W. Jeffries, S.E. Avis, D.D.N. Bevan, Performance of open access fem to cells in 4G macro cellular networks, in: The Wireless World Research Forum 20, WWRF 20, Ottawa, Canada, 2008.
[10] S. Alkhalaf, et al., E-learning system on higher education institutions in KSA: attitudes and perceptions of faculty members. Procedia Soc. Behav. Sci. 47 (2012) 1199–1205.