

IT Capability Mapping on Biological Students in the Industrial Revolution Era 4.0

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Keywords: Android, Anfisman, ICT literacy, Industrial Revolution.

Abstract: In this era of industrial revolution 4.0, the implementation of distance education or online learning in the future will have a strategic role in equitable access to education in Indonesia. The application of android that vary both in learning and in evaluation, provides a new atmosphere in learning. Students are always waiting for new things presented by the Lecturers. Students can interact with several android applications used in learning. The purpose of this study was to obtain preliminary information about the IT Literacy ability of students of Biology Education Study Program, as well as their basic knowledge profiles of IT literacy abilities. This study uses survey research methods with a quantitative approach. Data collection was carried out through a survey on Biology Education Study Program students in the 6th semester for Human Physiology Anatomy courses. Data analysis is calculated based on the number of checklist filled in by the respondent, then percentage to determine the level of perception of each student. Each respondent scores is summed up with other respondents and averaged so that the average score of the respondents' overall perception is obtained. The results show that 75% of students really like learning using an android application. As many as 85% of students will apply the applications taught when they become teachers in the future. Student learning outcomes are better, ie approximately 90% of students who graduate with satisfactory grades. They hope that in every lesson, the instructor can present a new breakthrough by displaying an android application so that learning is more enjoyable.

1 INTRODUCTION

In this industrial revolution 4.0 era, the implementation of distance education or online learning in the future will have a strategic role in equitable access to education in Indonesia, so it is expected that improving the quality of education is needed in equitable education through the use of information technology such as digital learning in the era of the 4.0 Industrial Revolution.

There are ten challenges in the 21st century, namely; speed (speed), comfort (convenience), generation wave (choice of age), choice (choice), variety of lifestyles (life style), price competition (discounting), value added (value added), customer service (customer service), technology as a mainstay (techno age), and quality assurance (quality control) (Balcaen & Hirtz, 2007; Hutchison & Reinking, 2011; Thammasaeng, Papat, & Petchaboon, 2016). From the trends of change and challenges in this 21st century revolution, the role of innovation is a determinant of the competitiveness of a product on

the market. The consequence is that human resources (HR) are needed which have data literacy skills (big data), technology literacy (coding, and understanding of Artificial Intelligence (AI) and human literacy (humanities, communication and design). able to overcome the gap between industries that depend on innovation and the readiness of the workforce, in addition to facing the rapid development of science and technology, the concept of lifelong learning is also important in order to keep abreast of the latest developments in science and technology. in fact globalization is a multidimensional phenomenon and organizations, products and services are better able to carry out multifaceted processes in the fields of economy, social, politics and to take advantage of new cultural implications for higher education (Imran, 2010).

IT literacy is an important part in producing superior human resources and the golden generation of the Indonesian nation, as stated in the Ministry of Education and Culture and Ministry of Research and Technology's Strategic Plan, and 2025 Indonesia's education vision. Teachers can assign assignments to

students through academic information systems to work at home. Students are free to do school assignments at all times. Students can do it anywhere. Schools that implement digital systems are also an academic social networking system that integrates 3 (three) things at once in a web-based system namely academic information systems, stakeholder education academic communication, and e-learning.

Student centred learning can be mediated by presenting interactive learning media, and student learning outcomes can be measured by presenting interactive forms of assessment. The application of assessment by using an interactive Android application can foster enthusiasm and high motivation to learn and learning to be active and fun.

Regarding learning in students at school, FKIP graduate teacher candidates should have the knowledge and skills to interact with android applications. For this reason, the lecturers in FKIP have a role in transforming IT skills and literacy to prospective teachers (students). The application of android applications that vary both in learning and in evaluation provides new nuances in learning. Students are always waiting for new things presented by the Lecturer. A good educator is always missed by the students. This indirectly provides new experiences in online learning, and students can interact with several Android applications used in learning. So that at the end of the lecture, students are expected to get to know and be directly involved in the use of applications that are effective in learning. This gives a positive contribution in supporting the profile competencies of study program graduates who prioritize IT independence and ability and are able to manage and big data literacy, as contained in the learning outcomes of graduates with level 6 Indonesian National Qualifications Framework (KKNI) for S1 graduates.

2 METHOD

This study uses survey research methods with a quantitative approach. Data collection was conducted through a survey of Biology education study program students in the 6th semester for the Anatomy of Human Physiology. Samples that can represent the population are taken using a multistage random sampling technique. Determination of the sample size of the population, determined by using the formula from Slovin (Fatimah Saleh & Lim, 2010) as follow:

$$N = \frac{N}{1 + Ne^2}$$

The ICT media which is the material in the instrument for collecting data as part of IT Literacy is limited to 4 topics, namely computers, internet, cellular phones, and tablets. The selection of ICT media is a familiar and popular media used by the public, including students.

2.1 Techniques for Collecting Data and Research Instruments

Applying various android applications in the form of learning media includes; Prezy application, Microsoft Powerpoint with countdown and hyperlink, Camtasia and screencast-o-matic that are integrated with Microsoft Powerpoint, Sparkoll Videoscribe application, and Powtoon presentation created.

Learning activities by downloading lecturer teaching materials, and uploading independent student assignments (in the form of papers or lab reports) can be done online, so they are no longer paperless (Hutchison & Reinking, 2011). The indirect benefit obtained by students is the introduction of the absence of paper in learning, so the important meaning of the paperless activity is that students feel an important part of one of the actions to preserve trees in the forest.

Student learning outcomes assessment is conducted online using the quiz feature in Moodle's Learning Management System (LMS), interactive evaluation using Mentimeter, i-spring quizmaker integrated with Microsoft Powerpoint, wondershare quizcreator integrated with LMS Moodle, speed and accuracy of assessment using plickers applications and zipgrade, applying form from Office0365 features and google drive.

Data analysis was calculated based on the number of checklists filled out by the respondents, then it was devised to determine the level of perception of each student. Interviews were conducted at respondents randomly to find out information that supports questionnaire contents (Fitriyadi, 2013).

The category of each indicator is transferred to an absolute number as follows:

Table 1: Indicator Category.

No.	Category	Skor
1	Proficient	3
2	Able	2
3	Underprivileged	1
4	Disable	0

Furthermore, each respondent scores summed with other respondents and averages so that the

overall score of respondents' perceptions is obtained as follows:

Average Score= Score of all Responden / Total Responden

For frequency data and school facilities support, the same thing is also done, namely:

Table 2: Frequency of School Facility Support.

No.	Category	Skor
1	Often (more than twice)	3
2	Rarely (more than once)	2
3	Ever (once time)	1
4	Never	0

Data processing and analysis is carried out through several steps, namely data editing, coding, tabulation, and data validation. Furthermore, the analysis is carried out using descriptive statistical techniques and associations for correlational data.

3 RESULT AND DISCUSS

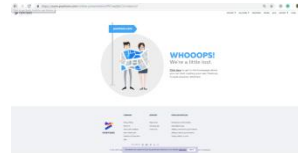
The results showed that 75% of students were very fond of learning using an android application. 85% of students will apply the application taught when they become teachers in the future. Student learning outcomes are getting better, with approximately 90% of students graduating with satisfactory grades. They hope that in every learning, the teacher can bring a new breakthrough by displaying an android application so that learning is more fun.

The use of survey form applications that are often used in learning is; google form (login with a google account), microform the office form (<https://forms.office.com/>), zoho form (<https://forms.zoho.eu/ahmadzulkifli477/home#myforms>), type form (<https://zulkifliahmad.typeform.com/to/kSN5mn>), monkey survey (<https://www.surveymonkey.com/mp/wufoo-online-forms/>) and many more online forms available that can be used to attract students.

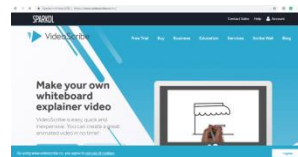
Online learning media displayed to students is also in the form of online quizzes. Student quizzes are made on Microsoft Sway Office365, then embedded in the Telegram group application. Example of using the online quiz at the following address: <https://bit.ly/2PIVXQv>.

The use of online learning websites for Human and Animal Physiology courses is also done at the address; <https://biokieraha.gnomio.com/course/view.php?id=19>. This website is designed in such a way that

students can use the available features, including downloading teaching materials, chatting between participants, online quizzes, online examinations, online assignments, and video conferencing that are linked to the zoom or skype application. Video conferencing has been done using the webex application, but is constrained by paid facilities.



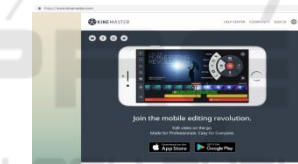
The initial appearance of the Powtoon (<https://www.powtoon.com/>)



The initial appearance of the Videoscribe (<https://www.videoscribe.co/en/>)



The initial appearance of the Screencast-o-matic (<https://screencast-o-matic.com/>)



The initial appearance of the kinemaster (<https://www.kinemaster.com/>)

Learning is done by using various learning media applications that are available for free on the internet. Students are introduced to the various applications, the uses and benefits of the application, and how to use them (tutorial). Previously the instructor gave an example of learning media to students, then at the end of learning, students were asked to make learning media (project assignment) with basic competencies in high school. The task of the project is to use online media applications, and students upload to YouTube (<https://www.youtube.com>) so that it can be seen by the public online:

Examples of links to assignments for students using videoscribe, powtoon, kinemaster or screencast-o-matic applications:



<https://youtu.be/P5DKqoHbino>
(using videoscribe application)



<https://youtu.be/DkZOrYg5pdU>
(using Powtoon application)

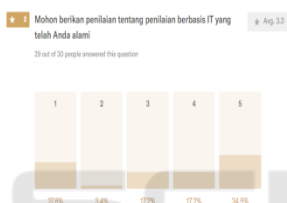


<https://youtu.be/MwMvw6KSLFg>
(using kinemaster application)

Students' responses and perceptions are obtained online using the online form (typeform), as follows:



100% of students are interested in IT-based learning



As many as 51.7% of students consider that learning with IT applied is good (by giving responses to stars 4 and 5). As many as 17.2% felt it was enough, and as many as 31% of students felt that the learning provided still lacked



As many as 58.6% of students consider that Anfisman's learning has been based on IT that has been applied well (by giving responses to 4 and 5 stars). As many as 17.2% felt it was enough, and as many as 24.1% of students felt that Anfisman learning still lacked



As many as 65.5% of students have a strong desire and 34.5% have the desire to implement IT-based learning if they become teachers later.



A total of 76.7% and 23.3% of students stated that they were inspired by IT-based learning that had been applied



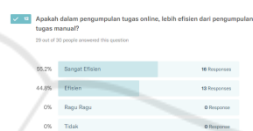
Students are happy with Anfisman learning that has been based on IT, which is indicated by a satisfaction rate of 80% and 20% happy



Students feel that their knowledge is better than before, which is 62% and 37.9% is very developed



Learning instructional materials are easily obtained by students, with responses of 96.5%



Students also responded that online task collection was very effective with a response of 55.2% (very efficient) and 44.8% (efficient)



In general, students feel impressed with Anfisman's learning which has implemented IT at 78.3%, feels sufficient (13.8%) and feels less at 3.4%

4 CONCLUSIONS

Based on the results of the research presented, it can be concluded that students are very enthusiastic and memorable with learning that is packaged with IT-based.

It is recommended that learning using a variety of models and learning media. Improving student learning outcomes depends on teaching creativity (lecturers) with learning media and the model applied.

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