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The Utilization of Smartphone Communication Technology as Digital Literacy Learning School Instruments in 4.0 Era

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Abstract. Numbers of institutes report that students' competency literacy on numeracy, readings and science is low. The presence of digital technology such as computers and smartphones has become part of the students' daily life. However, digital technology has not provided benefits for students to improve their competence. The challenges of education in the industrial era 4.0 are changes in learning ways, thinking patterns, actions on creative innovation that students have competitiveness in global market. The aim of the study is to explore: the educators' capability in era 4.0, teaching materials preparation, and digital literacy technical constraints. Explorative methods with descriptive analysis and test. Data is collected by open interviews, in-depth interviews and data reviews. Random samples are limited to 20 teachers and 40 students in Semarang. The acceleration of digital literacy is a necessity, namely data literacy, technology literacy; human literacy has not shown optimal utilization. Through Android-based learning automation and the like is necessary to be applied both media and learning resources. The media utilized can increase digital literacy total score of more than 78 of the indicators specified, besides that the use of this instrument is more efficient at around 60%. Optimization can be achieved by-design by teachers as facilitators.

1. Introduction

The phenomenon of smartphone use is increasingly massive, along with the development of the industrial era 4.0 has produced "smart factories" which can be integrated with various modular structured learning activities, physical-cyber systems oversee physical processes and present real conditions, and create virtual copies of the physical world with its unlimited range. Meanwhile, the utilization of smartphone technology for learning in schools is still very low and the area is not limited [1]. Even though competition in various fields between countries and nations is getting tougher. Data from a number of research institutions shows that student competency literacy in Indonesia is based on three components: numeracy, readings, and science is still low. The academic achievements of Indonesian SMP / MTs students as stated by TIMSS [2] in some countries are known as have reached the middle level and even high level. PISA reflection result [3] states that most of Indonesian students only master the lesson up to level 3, while many other countries reach levels 4, 5, and even 6. On the other hand, the existence of digital technology such as computers, smartphones has become a part of the students' daily life. Yet, ironically the existence of digital technology products has not provided benefits in improving academic competencies for students.

These conditions represent the educational challenges of the industrial era 4.0 in the form of changes in the learning ways, thinking patterns, actions on creative innovations that students have competitiveness in global market. The aim of the study is to explore: the educators' capability in era 4.0, teaching materials preparation, and digital literacy technical constraints. School is one of the main



gateways to accelerate digital literacy for developing interests, attitudes and abilities of individuals in the utilization of digital technology and communication tools to access, manage, integrate, analyze and evaluate information, build new knowledge, create and communicate with others in order to participate in society effectively [4] [5].

In line with the 21st Century Competency Framework, which needed to be accelerated by using smartphones as learning media as well as learning resources. Acceleration is a necessity, namely data literacy, technology literacy, human literacy through android automation-based learning and the like to find complementary information and support for understanding. Based on INAP survey results conducted by the Ministry of Education and Culture's Balitbang [6] the students' daily activities playing tablets, gadgets, computers around 2-3 hours / day. National statistics on 3 competencies (mathematics, reading, and science) students in less criteria (64.19%); enough criteria 31.06%, and good 4.75%.

Undoubtedly educators in the industrial era 4.0 must improve their understanding and abilities in the field of digital literacy. Expressed in designing learning, processes and formulating goals, strategies, choosing techniques and media as the genetic process of learning for students. Besides that, you can find analysis to solve academic problems in various things that are accessed through computer or smartphone devices.

2. Research Method

This research was conducted in Semarang, using a random sample limited to 20 teachers and 40 junior high/ MTs students. Sudden sampling technique (accident sampling). Exploratory methods with descriptive analysis and test research to develop hypotheses [7]; [8] and yield an overview [9] of acceleration of competency literacy: the numeracy, readings, and science studied. Data were collected through open interviews, indept interviews, tests and secondary data review.

3. Findings And Discussion

The technological development of era 4.0 makes the the spread of digital content faster, wider, and diverse. The acceleration of digital literacy is a necessity, namely data literacy, technology literacy, human literacy has not shown optimal utilization. Through Android-based learning automation and the like is necessary to be applied both as a media and a learning resource designed by educators. No less than 10 of the most sophisticated Android applications can be used as learning instruments in schools: *smart tools, google assistant go, google goggles, inkwire, pushbullet, tasker, shouter, ifttt, eva facial mouse, ir universal tv remote*. The use of the media improves the digital literacy. Students think critically, solve problems quickly and accurately, so that they can improve national competitiveness in the future, and be able to compete with developed countries both in Asia and world level. Based on the data, most students (92.5%) and teachers (100%) are smartphone users in schools with varied types and uses. The type of smartphone used by the latest students generation , namely 3G generation (*Three-generation technology*) and 4G (*fourth-generation technology*).

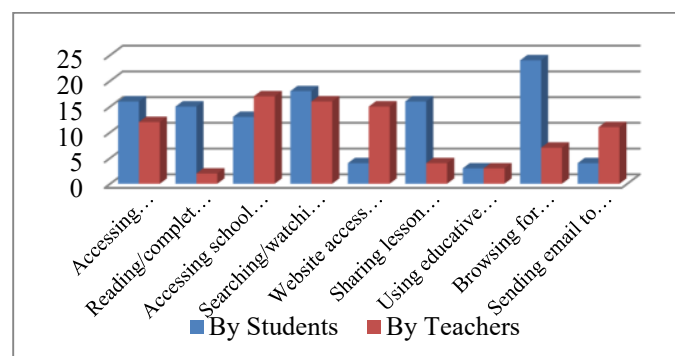


Figure 1. The Use of Smartphone for to Support Learning
Source: Primary Data, 2018 [10]

The frequency of smartphones usage for learning is relatively low compared to other interests (Figure 1). The general designation is to download various multimedia offerings, such as video streaming, music streaming, mobile TV, online games, film footage, animations, video clips, games, sports video clips, listening to music, and downloading study materials.

The results showed that most students (respondents) had sufficient ability and skills to use the applications available on smartphones (play store facilities) including applications related to educational content, such as brainly, mathway, edmodo, your physical, science challenge, speed anatomy and the like. Seeing this phenomenon, the reality of students in schools have high potential in using smartphones – based ICT.

However on the other hand, the potential has not been utilized for the benefit of learning in schools optimally. Smartphone is still used by more students for things outside the lessons, such as chatting with friends, comments on social media, taking photos / selfies, recording video, uploading news / pictures / films, editing images / photos / video, making animation, etc. [11] [12]. This is caused by the absent of *grand design* in the education system in Indonesia in responding to and utilizing technological and communication advances (ICT) that have developed very rapidly, especially related to learning.

The results of primary data analysis sourcing from 20 IPS RPP (Lesson Plans) of VII grade/ semester I on the theme: human, place, and environment with sub-themes: notions of space and interaction between space are allocated 4 periods (4 x 40 minutes) by applying scientific approaches and learning model of *Discovery Learning* and *Problem Based Learning*. In its implementation, only 6 RPPs used smartphones as learning instruments.

Learning steps at the core activities, facilitation carried out by the teacher by directing students to go on google for getting and scrutinizing the map of Semarang. Approximately less than 8 minutes, students will have it. The searched maps are displayed on an LCD (Figure 2a), students focus on activities observing, asking questions, gathering information, associating and communicating. Another example is (Figure 2b) activities for gathering information, associating, and can be immediately conveyed in class forums.

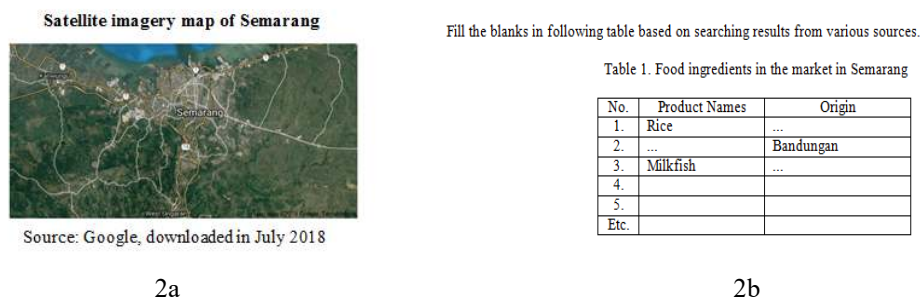


Figure 2. Learning Instruments

Source: Primary Data Analysis, 2018 (Sahidun, 2018) [13]

The utilization of smartphones as learning instruments as a medium and source of learning is not merely comprehending the concept of space and interaction between spaces as stated in the Basic Competence (KD 3.1) and presents the results of the study (KD 4.1).

The results of testing low to high level thinking skills were carried out by the research team by giving 6 (six) questions which must be completed by students within 40 minutes (1 Lesson Period). The students are divided into 2 groups, each group consists of 20 students. Group 1 (G1) does not use a smartphone, and Group 2 (G2) is permitted to use a smartphone.

Table 1. Record of Competency Test Results

Score Achievement	Scope Knowledge Test (Student)						Total Accumulative Score		Average time used (minutes)	
	Factual		Conceptual		Procedural		G1	G2	G1	G2
	G 1	G2	G1	G2	G1	G2				
Low < 7	14	3	5	0	7	3	171,7	47,1	45	21,38
Average 7 – 8,5	5	9	10	3	12	9	211	175,5	43,17	18
High > 8,5	1	8	5	17	1	8	60,3	298,5	40	20
Sub	144,3	175,4	157	178,9	141,7	166,8	443	521,1	128,17	59,38

Source: Primary Data Analysis, 2018 [10]

The use of smartphone reaches an accumulative total score of more than 78 of the indicators that have been formulated, besides that the use of this instrument is more efficient at around 60%. Looking at the competency of the test results in Table 1, the use of smartphones is most effective for factual knowledge.

undoubtedly *by design* by the teachers as facilitators according to the 21st century learning paradigm characterized by: information, computing, automation, and communication. While related to the design of learning, the use of smartphones has not received special attention from stakeholders of education in Indonesia. Even in a number of schools smartphones are strictly prohibited for students to bring, for various reasons and considerations which are more considered from the negative side [14] [15] [16]. Although the use of ICT has been recommended, such as e-learning, online learning, blended learning, and the like.

4. Conclusion and Implication of Policy

All parties must enhance collaboration in the future education orientation and change the performance of the education system that develops the quality of students' mindsets and strengthens the digitalization of application-based education. The role of smartphones in learning especially in ICT base is very necessary. Therefore real efforts are needed to utilize smartphones-based ICT as part of the learning system in schools. Smartphone technology has become an inseparable part of students' daily lives, both at school, at home, and in the community. This huge potential is responded positively by taking advantage of opportunities to support learning activities.

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