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Digital Learning, Smartphone Usage, and Digital Culture in Indonesia Education

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Introduction. The rapid development of information and technology has procreated a digital culture in Indonesian education. This article aims to depict the current condition of digital culture in Indonesian education by pointing at the issue of students' digital fluency, particularly the readiness for using digital learning resources and smartphone usage.
Materials and Methods. A combination of the survey and qualitative descriptive method was used to identify the students' intensity of using a smartphone, the description of students' smartphone usage, and the students' perspectives regarding the smartphone usage in learning activities. The data were collected through questionnaires from 384 students in the first grade of senior high schools in Surakarta, Central Java, Indonesia.
Results. The findings of the research show that the students regularly use the smartphone more than 6 to 7 hours a day. The students use the Internet to gather information or download the learning materials. Moreover, they strongly agree that smartphone usage will give benefits to them.
Discussion and Conclusion. The findings of research reflect that the students engage with the smartphone as a device to support their learning activities. The students' engagement reflects the positive impact of smartphone usage on the psychological and cultural dimensions of the students. Moreover, the teachers should uphold the students' digital culture by integrating digital material resources and smartphone usage into classroom activities.

Keywords: digital culture, digital learning resources, smartphone usage, digital fluency, technology utilization

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Цифровое обучение, использование смартфонов и цифровая культура в индонезийском образовании

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Введение. Быстрое развитие информационных технологий привело к формированию цифровой культуры в системе образования Индонезии. Цель данной статьи – проанализировать современное состояние цифровой культуры в образовании Индонезии, в частности необходимость уверенного владения современными цифровыми учебными ресурсами и смартфонами в образовательном процессе.

Материалы и методы. Сочетание приведенных опросов и качественного описательного метода применялось для определения интенсивности использования студентами смартфонов в учебной деятельности. В анкетировании приняли участие 384 учащихся первой ступени старших классов средней школы в г. Суракарта (Центральная Ява, Индонезия).
Результаты исследования. Результаты исследования показывают, что обучающиеся регулярно пользуются смартфоном (более 6–7 ч в день) для сбора информации или загрузки учебных материалов. По мнению респондентов, использование мобильных устройств помогает при освоении нового материала, а также положительно влияет на психологические и культурные аспекты студентов. Кроме того, учителя должны поддерживать цифровую культуру учащихся, интегрируя ресурсы цифровых материалов и использование смартфонов в школьные занятия.
Обсуждение и заключение. Статья будет полезна специалистам в области образования, а также всем, кто интересуется использованием новейших технологий в обучении.

Ключевые слова: цифровая культура, цифровые учебные ресурсы, использование смартфонов, цифровая грамотность, использование технологий

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Introduction

The rapid development of information and technology has procreated a digital culture in Indonesian education. Digital culture refers to the behavior, manners, and engagement of the students to deal with the technology and the nexus of the Internet as part of their learning process and environments [1]. The students become friendlier to digital learning material or mobile devices that simultaneously change their learning [2–4]. The existence of digital culture can be sensed from the usage of digital learning resources and mobile devices in the learning process [5; 6]. Digital learning resources refer to any digital material that contains learning substances, such as audio and multimedia, learning games, graphic images, photos, video, animation, programmed learning modules, electronic textbooks, and journal articles [7]. Meanwhile, mobile devices refer to any kind of portable computing devices such as personal digital assistants, tablet computers, mobile phones, or smartphones [8; 9].

Structurally, two dimensions support the procreation of digital culture in Indonesian education: the big number of Internet users and the regulation provided by the government. The survey data conducted by *Asosiasi Penyelenggara Jasa Internet Indonesia* or the Indonesian Internet Service Provider showed that 143.26 million people in Indonesia are the active users of the Internet. Widiastuti (2018) mentioned that 26.48% of Internet users are using the Internet for more than 7 hours per day[1]. Widiastuti added that 16.68% of Internet users aged 13 to 18 years old. Meanwhile, Indonesia got 5th ranked with approximately 83 million smartphone users in the world. By considering the high number of Internet users, the Minister of Education and Culture of the Republic of Indonesia has issued the Regulation Number 65 of 2013a about the Standard Process of Primary and Secondary Education to manage the use of digital learning resources and technology in the learning activities. The government states, "the utilization of information and communication technology is intended to improve the efficiency and effectiveness of learning". From this regulation, technology and mobile devices are constituted as a tool to support the learning activities and, consequently, it provides more space for technological usage and digital culture in education.

The students' intensity in using a smartphone and digital learning resources is the

[1] Widiastuti. [The Speech on the Dies Natalis XXXVIII Slamet Riyadi University: Surakarta: The Directorate of Public Information and Technology]. (In Indonesian).

representation of the digital culture in education. It is because the students are usually carrying their smartphone at school and use it to work with their learning tasks [10]. Conceptually, smartphone usage has a close relationship with students' literacy skills [11]. A smartphone can transform the students' learning culture and experience during the learning process [12]. Huang, Chen, and Ho and Skolverket emphasized that reading digital form provides many innovative and exciting applications to read with new and improved usage contexts[2] [13]. However, smartphone utilization can also give a paradoxical impact on the students. Bhih, Johnson, and Randles as well as Soikkeli, Karikoski, and Hammainen have pointed out the diversity of smartphone usage that reflects the diversity of user behavior and activities in the digital culture [14; 15]. Moreover, Lee, Chang, Lin, and Cheng, as well as Hsiao, Shu, and Huang's, have mentioned a negative impact of smartphone usage in generating psychological traits such as locus of control, the anxiety of social interaction, and materialism [16; 17]. On the other hand, Stachl et al. have found that personality traits also affect smartphone usage [18]. Kolikant marked an ambivalent impact of using ICT for school purposes in which the students feel that ICT is fun but at the same time also serious and problematic [19]. This gap, from Kolikant's perspective, can cause a disconnection between students' learning aspirations and school policies.

Considering the dialectical relationship and the paradoxical impact between smartphone and students' psychological and cultural dimensions, this article aims to depict the students' digital fluency, particularly in the readiness in using digital learning resources and smartphone usage. Four questions have been proposed:

1) How long the students use their smartphones in a day?

2) What kind of technological activities do the students use to support their learning activities?

3) Do the students believe that the smartphone will give a positive impact on their learning activities?

Literature Review

As it was mentioned, digital culture refers to the behavior, manners, and engagement of the students to deal with the technology and the nexus of the Internet as part of their learning process and environments[3] [1]. The students become more friendly to digital learning material or mobile devices that simultaneously change their learning culture [2–4]. One aspect of digital culture in education is the students' digital fluency. Students' digital fluency had been categorized as one aspect of digital intelligence [20]. The term of digital fluency can be coined back from Resnick argumentation. In the early 21st century, perceiving the US situation, Resnick had predicted the effect of technologization and digitalization for the learning revolution[4]. Resnick marked digital fluency and teacher and students rethinking about technologies as two important issues of the digital learning revolution in which it determines teachers and students to use the digital technologies and application in the learning process. Meanwhile, regarding the teacher and students rethinking about technologies, Resnick provoked three points of the question, namely: rethink how people learn, rethink what people learn, and rethink where and when people learn. Ming-tso and Chien's research had shown that the technologization and digitalization, as well as teachers' and students' digital fluency in the educational field, had brought a positive impact [21]. In more detail, digital learning generates a third space, where the teachers and learners face a new pattern of the learning process [22].

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[2] Skolverket. Läroplan för grundskolan, föreskoleklassen och fritidshemmet 2011. (Lgr11). [Curriculum for Elementary School, Preschool Class and Recreation Center]. Stockholm: Skolverket; 2011b. (In Swedish).

[3] Gere C. Digital Culture. 2nd ed. London; 2008.

[4] Resnick M. Rethinking Learning in the Digital Age. In: G. Kirkman, ed. The Global Information Technology Report: Readiness for the Networked World, Oxford University Press, Oxford; 2002. p. 32-37. Available at: https://llk.media.mit.edu/papers/mres-wef.pdf (accessed 23.06.2019). (In Eng.)

Digital fluency can make students be creative and independent participants in the learning process. They have the ability to control and choose technology utilization to support their learning activities [23–25]. Considering this theoretical framework, we decide to highlight four variables in the theory as a stance to examine the students' readiness in using digital learning material and smartphone, namely:

1. Frequency of students' smartphone usage.
2. Description of students' academic activities and smartphone usage.
3. Location where the students use their smartphone.
4. Students' perception regarding the smartphone usage in the learning process.

Materials and Methods

A combination of survey and descriptive qualitative was employed to gather and analyze the data about the students' readiness in using digital material resources and smartphone usage. The participants involved in this study were 384 students from the first grade of Senior High School in Surakarta, Central Java, Indonesia. The questionnaires were employed to investigate and obtain the information regarding (1) the frequency of students' smartphone usage, (2) the description of students' academic activities and smartphone usage, (3) the location where the students use their smartphones, and (4) the students' perception regarding the smartphone usage in the learning process. The instrument of research consists of three forms of questionnaires. The data were then analyzed quantitatively and qualitatively to find the tendency of the students' readiness in using digital learning resources and smartphone usage. All data provided will remain confidential.

Results

The data of the survey shows the average hours of smartphone usage by a majority of the students are six (24.21%) to seven (23.43%) hours in a day. The minimum hours are spent by the students to use their smartphone is 3 hours. Meanwhile, five students have stated that they use their smartphone more than 10 hours in a day. Table 1 presents the detailed frequency of smartphone usage by the students:

The authors also found that most of the students often use their smartphones to improve the quality of the learning process. The activities that students tend to do are downloading learning material from YouTube (39.32%), downloading learning video (38.80%), downloading learning audio (42.18%), and downloading learning material (39.84%). The detailed percentage of smartphone usage and students' academic activities can be seen in table 2:

The students stated that they did not use their smartphone in the classroom, laboratory or library. However, most of the students regularly used their smartphones elsewhere in school (49.22%), home (50.26%), and public spaces such as the café, food court, and department store (56.77%). Table 3 presents the location of smartphone usage by the students:

Table 1. **Frequency of Using Smartphone**

Frequency of Using Smartphone in a Day	Number of the Students (n)	Percent
1 hour	0	0
2 hours	0	0
3 hours	11	2.86
4 hours	15	3.90
5 hours	47	12.23
6 hours	93	24.21
7 hours	90	23.43
8 hours	71	18.48
9 hours	42	10.93
10 hours	10	2.60
More than 10 hours	5	1.30

Table 2. **Students' Academic Activities,** %

Academic Activities	Very Often	Often	Sometimes	Rarely	Never
Opening e-mail	17.70	33.07	34.89	7.81	6.51
Reading documents	14.84	35.93	38.02	8.59	2.60
Downloading learning material from YouTube	39.32	33.59	22.65	4.42	–
Downloading learning video	38.80	34.63	21.35	5.20	–
Downloading learning audio	42.18	38.28	18.22	1.30	–
Downloading learning material	39.84	33.07	22.39	4.68	–
Uploading videos	5.20	10.93	32.55	51.30	–
Accessing digital library	3.12	13.02	33.07	50.00	0.78
Accessing online journal	–	–	8.33	16.66	75.00
Online learning	12.80	41.66	13.54	9.63	1.82

Table 3. **The location of smartphone usage by the students,** %

Location	Regularly	Often	Seldom	Never
At the library	–	–	–	–
Elsewhere on school	49.22	41.67	9.11	–
On the go (e. g. on the bus, on the car)	45.05	49.74	5.20	–
In the classroom	–	–	–	–
In the laboratory	–	–	–	–
At home	50.26	48.70	1.04	–
Other (café, foodcourt, dept. store)	56.77	43.23	–	–

The students were also asked about their perception regarding the impact of smartphone usage in their learning process or not. The detailed percentage of students' perception can be seen in table 4:

Table 4. **Students' perception towards smartphone usage,** %

Items	Strongly disagree	Disagree	Agree	Strongly agree
Smartphone positively affects my learning style to be more creative and imaginative	–	–	49.73	50.26
The use of smartphone helps students to find related knowledge and information for learning	–	–	26.04	73.95
The use of smartphone becomes my routine habit to access the learning material	–	3.38	45.31	51.30
The use of smartphone through online learning is more effective	–	7.03	52.86	40.10
Smartphone can be an effective tool for learning	–	3.90	46.87	49.21
The use of smartphone can help the students to study easily	–	4.95	56.51	38.54
The use of smartphone can help students to broaden their knowledge	–	–	71.87	28.12
The use of smartphone enables students to express their ideas and thoughts better	–	4.43	63.54	32.03
The use of smartphone promotes active and engaging lesson for students' best learning experience	–	5.47	11.19	83.33
Smartphone can help the students to express their feeling and their ideas	–	2.86	82.03	15.10

Table 4 shows that the students perceive the positive impact of smartphone usage on their learning activities. The students believe that smartphone can enhance their creativity, imaginative thinking, ideas, and learning experiences.

The findings of the research show that the students normally use their smartphones 6 to 7 hours a day. Most of the students use their smartphones for academic activities and gather the learning material from the Internet. The students tend to use their smartphone outside of the classroom, library or laboratory. Moreover, the students perceive that smartphone usage will give a positive impact on their learning culture.

Considering those findings and results, it can be summed up that the research participants already have digital fluency in which they able to choose and control the utilization of technology in the learning process. Those can be proved by the students' readiness in using digital learning materials and smartphone.

Discussion and Conclusion

The findings of the research, which depicts the current condition of students' readiness in using digital learning resources and smartphones, have shown the nature of digital culture in Indonesian education. To a certain degree, the digital culture can be seen on the level of students' intensity in using digital learning resources [2–4]. From the survey, the authors have marked that the students seem familiar with a smartphone with the average smartphone utilization is up to 6 until 7 hours a day. The students spend their time to gather learning material from the Internet. Moreover, in line with Karaganis, Lam and Tong, Chaka and Govender's findings, the students perceive that smartphone usage will give a positive impact on their learning culture and learning participation [12; 26; 27]. This positive perspective can affect the psychological and cultural dimensions of the students [16–18]. Moreover, the students' tendency in smartphone usage, which has been highlighted by Bransford, Brown, and Cocking's[5], Norries, Hossain, and Soloway, and Woodcock's, shows that the students require a smartphone to support their learning activities [10; 28]. Twum has highlighted that smartphone usage will create a new understanding and insights into the ideal concept of learning and education [29]. The students already have an understanding of smartphone usage for educational purposes. The findings of the research have depicted the transformation of students' learning styles when they engage with the technology and the Internet. By considering this nature, therefore, teachers can bring the smartphone into the classroom. As pointed out by Gayle, the students will have a new learning experience through smartphone usage [30]. In line with Pinto, Pouliot, and Garcia's argumentation, the use of digital learning resources and smartphones can offer a broad source of academic knowledge [31]. It means, this kind of learning experiences leads the students to be an independent learner[6].

The authors highlight the integration of technology, especially smartphones, in teaching and learning activities in Indonesia, can be implemented and potentially will give a positive impact on students' learning outcomes and increase the motivation and self-confidence of the students. This is because digital devices, especially smartphones, enable various learning experiences and support the colorful images, audio and video so that learning materials become interesting and can be easily understood by students. The findings of this study are useful for the students and

[5] Bransford J., Brown A., Cocking R. eds. How People Learn: Brain, Mind, Experience, and School. (ed.). Washington, DC: National Academy Press; 1999. (In Eng.)

[6] Project Tomorrow "Creating our Future: Students Speak Up about their Vision for 21st Century Learning" March 2010. Available at: http://www.tomorrow.org/speakup/pdfs/SU09NationalFindingsStudents&Parents.pdf (accessed 23.06.2019). (In Eng.); Project Tomorrow "Unleashing the Future: Educators Speak Up about the use of Emerging Technologies (May 2010). Available at: http://www.tomorrow.org/speakup/pdfs/SU09UnleashingTheFuture (accessed 23.06.2019). (In Eng.)

teachers, who can use their smartphones to make learning more fun and enjoyable. As pointed out by McAlister, the teachers can blend their pedagogical knowledge with information and technology to produce a "well grounded, engaged students", who can go beyond the classroom and explore the borderless world of information [32]. As Pierson emphasized that integration of information and technology in education is the essential element of good teaching [33]. Moreover, the utilization of information and technology is categorized as the compulsory skill of the students in facing the 21st century[7]. Therefore, since the findings of this study suggest students' readiness to use smartphones in the learning process, the teacher should take this opportunity to make learning more enjoyable to promote lifelong learning.

Students' digital culture should be more accommodated in the curriculum to improve the outcomes of technology utilization in the classroom. Curriculum determines the learning practice and students' learning environment, which are very useful to support technological utilization at the practical level [34]. The main problem of the curriculum advancement lies in the question regarding the position of technology in curriculum or even in the system education, whether it becomes the complementary element of the existing curriculum or the backbone of the advanced curriculum. Another question is about the direction of curriculum based on technological between supporting individualistic learning and independent learning. Those questions are hard to answer but that will affect the future of Indonesian education. Certainly, the curriculum must be able to anticipate the rapid development of technology and information. However, the authors believe that technology should be posited as the supporting system for educational practices.

In the context of digital learning, connectivism appears as the learning theory that can be adapted for technological and information development in the classroom. It provides learning space for the students to gather information from online sources independently by using the Internet network such as in the Massive Open Online Course (MOOC) [35]. Despite emphasizing technological utilization, teachers still have a significant role in the connectivism. Teachers become facilitators or absent in the learning process but providing some indirect directions to the students [36]. At the students' level, following So, Chen, and Wan's framework, self-regulated learning can be an appropriate framework for the students in dealing with connectivism [37]. Practically, self-regulated learning can be used for the students to manage the use of technology and select an appropriate device in the classroom as an independent learner [38]. However, as pointed by Madsen, Archard, and Thorvaldsen, the top-down educational policy of technological utilization could trigger resistance especially in the term of teachers' acceptancy towards the educational policy [39]. Madsen, Archard, and Thorvaldsen stated that the resistance of educational policy and technological utilization comes from teachers' skill deficiency in using technology in the classroom. Therefore, the top-down policy should be accompanied by a pedagogical approach that accommodates teachers' deficiency and more social interaction on it to enhance the learning process.

As pointed by Jung, social interactions and networks must be considered in connectivism [40]. In the authors' perspective, socio-connectivism can be defined as an approach that elaborate socio-constructivism and connectivism. The authors called this approach as socio-connectivism rather than post-connectivism. The use of technology can generate individualistic students since they only focus on e-learning without considering their social environment. In many recent studies, such as Alzain's research, proves the impact of social networks and interaction in connectivism learning practices through collaborative e-learning based on connectivism theory [41]. Social in-

[7] Trilling B., Fadel C. 21st Century Skills Learning for Life in Our Times. San Francisco: CA Jossey-Bass; 2009. (In Eng.)

teraction and networks become important to diminish the potency of individualistic students in connectivism [42]. Thus, connectivism leads the students to become independent but not individualistic learners. Therefore, the use of technology-based on connectivism approach will be able to anticipate individualism as the negative impact of technological utilization in the classroom. Practically, technological devices should be operationalized in classroom-based on the cooperative or collaborative learning model. It means the use of technology can be implemented in the learning process by elaborating on the technology and emphasizing social interactions and networks. The authors should select suitable technology devices and appropriate learning models to support the utilization of technology in the learning process. For instance, the use of smartphones can be paired with a cooperative learning approach to foster the effectiveness in the learning process or the use of flipped classrooms using unified modeling [43].

Based on the above discussion, technology devices can be inserted in the educational process through an appropriate curriculum that accommodates the demand for connectivism and social interaction and networks. The elaboration of connectivism and cooperative or social interaction and network can be defined as socio-connectivism as the advanced learning approach to accommodate the students' digital fluency and culture and support the effectiveness of the learning process based on technology utilization. The authors believe that the use of technology can be implemented efficiently in the learning process by elaborating on the utilization of technology devices and the cooperative learning model. Teachers should select appropriate technology devices and learning models to foster the impact of technology utilization in the learning process. By appropriate learning approach and technology devices, the students' digital fluency and culture can be directed to strengthen the practice of education and technological utilization.

Overall, this research has depicted the digital culture in Indonesian education in which the students seem to be ready for smartphone utilization and digital learning resources in the learning process. The limitations of this research relate to the research population, which only consists of the Senior High School students in Surakarta area, Central Java; hence, the results cannot be directly generalized to all situations. The authors mark some challenges being faced in implementing digital learning resources, particularly in Surakarta, Central Java, Indonesia, including digital material, technical limitations of the network, the lack of e-learning, and lack of smartphone usage skills. It also should be noted that the population and the sample of the research might not represent the whole condition of digital culture in Indonesia. Thus, in further research, more participants should be analyzed to depict the students' diversity. As pointed out by Bhih, Johnson, and Randles [14] as well as Soikkeli, Karikoski, and Hammainen's [15], the student diversity, which reflect on the various types of student intensity in using a smartphone, should be considered more deeply by the educator to completely identify the readiness of the students in using smartphone in the learning process.

The findings of the research have depicted the current condition of digital culture in Indonesian education. The authors highlighted that the students are using their smartphones 6 to 7 hours a day. They are using their smartphones for educational purposes, mainly at home or in public spaces outside of the classroom, laboratory, or library. They also believe that smartphone usage will give benefits and positive impact on them. The authors recommend to the teachers to be concerned with the digital culture by integrating the digital material resources and smartphone usage into classroom activities. The teachers should follow the rapid development of technology. On the other hand, the government should also provide more facilities and Internet connectivity at schools to support the nature of digital culture in Indonesian education.

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