Digital native levels of Indonesia pre-service teachers

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Abstract. The generation classification based on technology proficiency skill consists of digital native and digital immigrant. Digital native assumed as superior in technology usage. Viewed from demographic aspects related to age, elementary school-age children of the current era tend to adopt the digital native characteristic. These characteristics may require teachers to integrate the learning methods and technology. This study aims to assess pre-service teachers’ digital native characters. They are projected to be teachers of digital native students. The assessment was made by using the Digital Native Assessment Scale developed by Teo in 2013. The use of the instrument was intended to pilot the DNAS in Indonesia education context. This study used a qualitative research design, since it involves qualitative data and analysis stages. The sample involved were 130 students (112 females and 18 males) of the Elementary School Preservice Teacher in Indonesia. Their age ranged from 18 to 24. Based on the study results, the digital native level of preservice teachers in Indonesia was high. If seen from a gender variable, the digital natives do not have any significant differences. Although this result cannot be fully generalized, it can be used as a reference both for curriculum development in teacher education.

1. Introduction
Changes in the social order of society can be assumed to be the impact of technology penetration [1,2]. One of these changes is reflected through the distribution of information patterns that are increasingly accessible to the public [3]. For example, print-based mass media tends to be replaced by the digital-based mass media that can be accessed via smart phones. The ease of accessing this information can also be felt by students, so that learning resources becomes relatively richer because they are not only sourced from the books and the teachers. This situation can be a challenge for teachers, because teachers are required to integrate learning and technology [4].

Students who are the recipient of education in the context above can be categorized as Z Generation or Net Generation, because students of that generation were born and grew side by side with technology, and are relatively capable of qualified technological skills [5]. In another literature, this generation is popularly called digital native, while the previous generation is called digital immigrant [1]. Seen from the demographic aspects to age related, individuals who born after 1980 are categorized as digital native [4].

The characteristics of this generation, among others, are being interested and involved in online communities, having high curiosity, being independent, smart, able to adapt, having high self-confidence, and globally oriented [2,6]. Another thing that distinguishes between digital native and digital immigrant is the access to information. At the same age, digital immigrants tend to be only exposed to local information, but digital natives have the opportunity to access both local and global information [2]. Based on the previous study related to digital native characters, this generation has
several characteristics that distinguish it from its predecessor generation i.e. tends to receive information quickly, be able do multitasking work, good at using images as the medium of communication, and happy to receive awards [7].

The digital native characteristics can be used as a reference for the 21st century education providers whose students are dominated by digital native. In this regard, the assumption arises that in providing an ideal education for digital native students, teachers should be able to adopt digital native features [4]. Therefore, extracting information about the level of acquisition of native digital feature owned by the teacher can be used as a reference for the matters related to improving the quality of education in the form of enhancing teacher professional skills, curriculum development, and learning implementation [6].

The measurement of the level of digital native acquisition can be carried out by using the Digital Native Assessment Scale (DNAS) instrument developed by Teo [8]. DNAS consists of 21 items with a Likert scale unit 1 (Strongly Disagree) up to 7 (Strongly Agree), which aims to measure the level of obtaining digital natures that includes grow up with technology (GrowT), comfortable with multitasking (MultiT), reliant on graphics for communication (GraphicC), and thrive on instant gratifications and rewards (InstantGR) [9]. These four aspects sequentially refer to the ability to use the latest digital technology, the ability to do work simultaneously, the tendency to use images and graphics in communication, and the tendency to have a sense of desire to be appreciated [8]. These instrument developers have tested the validity and reliability of these instruments, but need to be tested in various cultural contexts to test their validity more broadly [9]. The sample item of the instrument can be seen in table 1.

| Characteristics of Digital Native | Statements                                      |
|----------------------------------|-------------------------------------------------|
| GrowT                            | I use the internet every day.                   |
| MultiT                           | I am able to communicate with my friends and do my work at the same time. |
| GraphicC                         | I use pictures to express my feelings better.   |
| InstantGR                        | I expect quick access to information when I need it. |

Some researchers that have used DNAS instruments conclude that respondents who are assumed to be digital natives have the four digital native characteristics above, but when classified further according to age range <19, 20-29, and> 30 there is a potential difference in the level of acquisition [7]. Therefore, this study seeks to fill this gap by examining the potential of gender variables as distinguishing levels of acquisition of digital native characteristics, and testing the use of DNAS instruments in Indonesia as a form of testing the validity of these instruments in a broader context. Respondents involved are pre-service teacher students in Indonesia, so that the results are expected to illustrate the level of acquisition of native digital traits of prospective teachers who will teach digital native students in the future. The results of this study can also be used as a reference to take preventive measures for teacher education providers if the results show a low level of digital native feature.

2. Method
This study involved 130 respondents that consist of 18 men and 112 women. The age range of respondents ranged from 18 to 24. The respondents are students of the Primary School Teacher Education study program at a university in Indonesia. A number of these respondents were selected by using purposive sampling techniques based on consideration back-grounded on elementary school teacher education. The samples are projected to be a teacher who teaches digital native students.

The research design used in this study was qualitative research, because it involves qualitative data and analysis stage. The qualitative data is the students' perception of the digital native characteristics they have, which are converted into numbers on a Likert scale. Statistical calculations involved in the data analysis stage are descriptive statistics. Descriptive statistics were used generally to see the
acquisition level of digital natives' characteristics, and to see the potential of gender variables as a differentiator of the acquisition of digital native characteristics. The data collection procedure in this study consisted of several stages starting from the enforcement of data collection ethics addressed to the university and related respondents. Permission requests are addressed to the university in order to provide access to interact with students during the data collection session. The second stage is data collection. At the time of data collection, respondents were given an understanding of the research objectives, and were briefed that the involvement in this study was voluntary and without any compensation. Respondents were asked to fill out questionnaires on each cell-phone because the questionnaire was online made by utilizing the Google Form facility. The length of data collection is ± 15 minutes.

After the data was collected, then it was analyzed by using descriptive statistics to see the level of digital native acquisition and the potential of gender variables as a differentiator of the level of digital native acquisition. The level of acquisition is compared to the Likert scale which is used to measure respondents' perceptions i.e. number one on the instrument describes the perception of Strongly Disagree which illustrates the low mastery level; and the sixth number on the instrument describes the perception of Strongly Agree which illustrates a high mastery level. The description of these numbers and their connotation can be seen in table 2.

Table 2. Categorizing the perceptions and the level of acquisition of digital native characteristics.

| Score | Digital Nativity Perception | Digital Nativity Degree |
|-------|-----------------------------|-------------------------|
| 6     | Strongly Agree              | Very High               |
| 5     |                             |                         |
| 4     |                             |                         |
| 3     |                             |                         |
| 2     |                             |                         |
| 1     | Strongly Disagree           | Very Low                |

This research instrument is a DNAS instrument developed by Teo in 2013. Several modifications were made to the instrument, i.e. language translation from English to Indonesia language, reduction in the number of scales, and the addition of the word Smartphone to the instrument. The language translation that is carried out is contextual because all respondents are Indonesian citizens. In addition, the reduction in the number of scales range from 1-7 to 1-6 aimed to avoid a middle value that can trigger bias as naturally respondents tend to choose the middle value, and to facilitate decision making. The addition of the word Smartphone to the instrument is intended to increase the level of relevance between the content of the instrument and the condition of respondents, because the respondents involved are students who have access to use computers both private and campus facilities, and students who have both regular phone and Smartphone.

3. Results and Discussion

The acquisition of digital natives in pre-service teacher education is expected to be one of the factors that support the success of students in a career in the future, because future teachers will face students who have the character of digital native generation. The significance of the above facts is that meaningful learning will be constructed if the teacher can convey learning in a way that is appropriate to the character of the student [10]. Data exposure on the level of digital native character acquisition for teacher students can be seen in table 3, and table 4 presents data on the potential of gender variables as variables that can affect the acquisition of these characteristics.
Table 3. The acquisition level of pre-service teacher students’ digital native characteristics.

| Characteristics of Digital Native | Digital Nativity Degree |
|----------------------------------|-------------------------|
| GrowT                            | 4.86                    |
| MultiT                           | 4.53                    |
| GraphicC                         | 3.6                     |
| InstantGR                        | 4.86                    |
| Average                          | 4.46                    |

3.1. The acquisition level of pre-service teacher students’ digital native characteristics

The results below were taken from the observations on pre-service teacher respondents aged 18-24 years. The first result is that respondents who represent pre-service teacher students in Indonesia tend to have digital native characteristics. This indicates that acquiring digital characteristics can be a universal phenomenon. This phenomenon is assumed as the impact of technology penetration in society.

The second result is that the digital native characteristics of pre-service teacher students in Indonesia are at 4.46. This figure can be assumed to be quite high when viewed from a scale range of 1 (Very Low) to 6 (Very High), but has not reached a maximum level. This inadequacy can be used as input for teacher education providers to equip their students with skills that reflect the digital characteristics that are relevant to the educational context.

The third result is that the acquisition of GrowT and InstantGR aspects is at the same level of 4.86. The similarity reveals due to the same demographic variables, especially when viewed from the age and students’ status. The acquisition of GrowT aspects for students in this context is due to demands that require students to master technology to support their learning progress. While the acquisition of InstantGR aspects is related to the respondent’s age variable. This phenomenon is relevant with the previous study found that people in the age between 18-29 years of age tend to desire recognition from the surrounding and be an active media social user [11].

The fourth result is the average acquisition of GraphicC aspects tends to be at 3.6 or the lowest if compared to other three aspects. This low aspect caused by respondents’ level of understanding of visual communication. This can be used as a foundation for university that hold pre-service teacher education so that they can equip their students with multimodal material delivery skills.

3.2. The potential role of gender variables as a differentiator of digital native characteristics acquisition

One of the objectives of this study is to explore the potential of gender variables as variables that can influence the acquisition of digital native characteristics. In table 4 presented data, on the level of digital native characteristics acquisition seen from gender variables.

Table 4. The acquisition level of the digital characteristics of pre-service teacher students based on gender variables.

|                 | Men | Women |
|-----------------|-----|-------|
| GrowT           | 4.92| 4.85  |
| MultiT          | 4.53| 4.53  |
| GraphicC        | 3.73| 3.58  |
| InstantGR       | 5.01| 4.83  |
| Average         | 4.55| 4.45  |

The conclusion that can be drawn from the data in table 4 is that the level of digital native acquisition of men and women is not significantly different, because the difference in values between the two groups is only 0.1. This may indicate that gender variables do not affect the acquisition of digital native
characteristics, and confirm that the phenomenon of acquiring digital natives can be a universal phenomenon across gender.

In addition, several other similarities that can reinforce the above conclusions include the GrowT and InstantGR aspects which are dominating aspects, the same values in the MultiT aspect, and the GraphicC aspect are the lowest aspects of both male respondents and female respondents. The first similarity is related to the GrowT aspect. The similarity is due to the same age range between the two groups of respondents. This confirms that the age variable is a variable that can affect the acquisition of digital native characteristics [7], so that it can lead to the conclusion that the longer a person is exposed to technology the higher the level of acquisition of digital native characteristics. In addition, the first similarity is also related to the InstantGR aspect, because in the age range of 18-24 people tend to be addicted to technology [1]. One of the causes is the existence of social media that can facilitate its use to obtain awards and recognition from the surrounding.

The second similarity is the similarity that occurs in the MultiT aspect. This is due to the interpretation of respondents who consider the electronic devices referred to in the questionnaire are cell-phones. In some phones there is no feature that allows users to run several features simultaneously as well as on a computer. This can be a trigger for the similarity of obtaining this aspect in both groups of respondents.

The third similarity relates to the GraphicC aspect. This can be triggered by the absence of subject that contains a study of visual communication and the use of multimedia in learning. In addition, the campus has not facilitated respondents with computer laboratory facilities that can support the development of digital literacy capabilities.

4. Conclusion
The acquisition of digital native characteristics can be a universal phenomenon, because it occurs across regions and across gender. This is confirmed in this study, as the results of this study state that the acquisition of digital native characteristics also occurs in the context of Indonesia education, and its acquisition may not be affected by gender variables. The implication of this research is that the identification of obtaining aspects of low digital native characteristics can be used as a reference for education providers to improve this aspect.

This study has several limitations that can be used as a stepping stone for further researchers including data analysis using only descriptive statistics, so that in the future researchers can further strengthen the results of this study using inferential statistical analysis; the sample involved only includes one university, so more samples are needed to confirm and generalize the results of this study; DNAS instruments that are translated into Indonesia language have not passed the validity and reliability testing phase to avoid bias; and no excavation of the potential of other variables that include the intensity of exposure to technology, and experience following participation in developing digital capabilities.

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