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Effects of 21st Century Learning on the Development of Critical Thinking, Creativity, Communication, and Collaboration Skills

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Abstract. 21st-century teaching needed in the Package C equality education program because it is the key to developing the critical thinking, creativity, communication, and collaboration (4C) skills of students. These skills are not optimally encouraged for students of the program even though they have to adapt to changing environment. This research intended to reveal the effects of 21st century learning toward development of the 4C skills for the program. The method used was survey through a quantitative approach. The research population numbered 2,268 students in Special Provine of Yogyakarta, Indonsia, all of whom being registered in the Community Learning Activity Center (CLC) or the Learning Activity Center (Sanggar Kegiatan Belajar (SKB)). The research sample was Paket C students selected through a quota sampling technique, numbering 301 students. Data collected by distributing online questionnaires and analyzed using regression analysis by SPSS 24. The study concluded that influence of 21st century learning influences significantly on development of the 4C skills of students in the Paket C equality education program. Therefore, to develop quality of the program, it is needed research plannedly, innovative and sustainable to create and support forming of the 21st century skills for students.

Key words: 21st century learning, skills 4C, equality education

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INTRODUCTION

Transformation to Industry 4.0 delivered an impact to nonformal education institutions providing various educational services to an individual and/or society. One of the services is *Paket C* equality education service, whose goal is to provide all Indonesians with an opportunity to obtain high school equivalent education. In Indonesia, *Paket C* equality education program has an important role to guide Indonesians to have outstanding qualities of being capable to develop their full potencies and abilities, improving themselves and their environments, and playing an active role in life or taking self-development education or activities. Empirically, this *Paket C* program is intended to provide education to those who have not taken senior high school education level due to financial difficulties, limited access to equality education, disadvantageous geoFigureal factors, or social-psycho factors that derail learners (Ishofwan, et al, 2021). This program, by jurisdiction, may be conducted by non-school government agencies, *pondok pesantren* (Islamic boarding schools), community social foundations, community learning activity centers (CLC), and others.

One of the various impacts of such a transformation affects the students' mastery of the learning results (output) and the implementations (outcome), i.e how students' learning capability of the education program is developed in compatibility with industrial revolution 4.0. This capability, further described as critical thinking, creativity, communication, and collaboration (4C) skills, is of absolute necessary, allowing students to adapt to the changes occurring in the community and be able to solve problems in life as an individual or a social being. Lacking this capability, a student may not be ready to play a role in community life, resulting him to provide insufficient positive contributions to community development and even become an unproductive citizen (Prasetyo & Wahyudi, 2018). Thus, at the management level of the equality education, making use of the information and communication technological advancements in the learning process of developing 4C skills is imperative and must be an integrated part of the development of the environments, and students are expected to optimally develop their capability. The availability, accessibility, and useful implementation of information and communication technology in the activity and learning managements need to be continuously developed so that learning continues, reaches unserved target groups, and introduces effectiveness and efficiency in education management.

As a means for students to be able to adapt to the changes mentioned previously, 21st century learning as an innovative tool should be accommodated in the implementation of *Paket C* equality education. 21st century learning is basically a proper thing to do as it allows an opportunity for optimal development of potentials of an individual by positioning

students as the subjects of education. In Indonesia, this kind of education has already been adapted into the national education system throught the implementation of *Kurikulum* 2013 (K-13, Curriculum 2013) which emphasizes student-centered and 4C skill development-oriented learning. Unfortunately, the implementation of this kind of learning is still far from optimal in developing 4C skills due to the facts that educators still rely on the use of conventional approaches and methods in conventional learning and low innovation in learning (Adrian & Rusman, 2019; Junaedi, et al., 2019). In regard to equality education management, preliminary research focusing on 21st century competence is meager as research is dominated by the ones focusing on people's learning motivation (Estafianto, Fakhrudin, Sutarto, 2020; Senjawati, et al., 2017), learning process (Hardika & Triamansyah, 2020; Nengsih & Himi, 2019; Mustangin, 2018), and learning impact (Asran, 2011; Salman & Tohani, 2019).

In reference to this view, a study needs to be conducted to understand how mastery of the communication, critical thinking, collaboration, and creative skills of the *Paket C* students are developed through the implementation of 21st century learning. Data obtained through this study will serve as a valuable input to the improvement of the learning quality of the equality education program.

In regard to industrial revolution 4.0., all learners should possess 21st century skills to be able to adapt to life. 21st skills, according to experts, diversely vary and include skills for mastering knowledge, metacognitive skills, problem-solving skills; ability to think critically and creatively, communicate and collaborate effectively; using communication and information technology; making use of media; cross-cultural communication; career development and promotion; and self-development (Trilling & Fadel, 2009; Trinidad, et al., 2013; Hughes & Maas, 2017; Murugiah, 2020; Bakir, 2019; Sari & Winda, 2019; Sholihah & Lastariwati, 2020; Koenig, 2011). This research specifically refers 21st century skills to innovation and learning skills (Trilling, & Fadel, 2009) comprised of critical thinking, collaboration, communication, and creativity which are elaborated in the following:

- Critical thinking skills show that individuals are able to make decisions, respond or comment with consideration, willing to correct their mistakes, able to analyze things systematically, dare to convey the truth even though it is difficult to bear, are meticulous, honest, and sincere, act fairly, and avoid harming others.
- Collaboration skills show that individuals are responsible for their actions, work productively, show flexibility and are able to compromise, are able to manage tasks or projects well, and have mutual respect for other individuals (Greenstein, 2012).
- Communication skills include the ability to listen and understand well, ask questions that lead to problem solving, and set a goal that leads to mutually beneficial solutions.
- Creativity skills show that individuals can think imaginatively, have a good curiosity, desire to explore and try new things, like challenges, and have and understand ambiguity.

Skills mentioned previously are required by the students to face and adapt to the social changes, allowing the learners to survive and compete well in life (Suminar, et al, 2021). 4C skills enable students to face and adapt to the development of the environment, compete, make use of the potentials to identify and solve problems, create opportunities, work effectively, improve their verbal and analytical skills, reflect to themselves, socialize, be heedful to the environment, and control egos and emotions, and develop thoughts and ideas to solve problems (Griffin & Care, 2015; Bourn, 2018; Rhedana, 2019; Fakhriyah, Masfuah & Mardapi, 2019). By mastering 4C skills, students are expected to be ready for competitive work life, self-development, and doing their social functions in accordance with their fields of interest.

For 4C skills to develop in students, 21st learning, as an innovative effort, should take place. 21st century learning is the process of facilitating students to have skills, knowledge, and abilities in a variety of fields such as technology, media and information, learning and innovation skills, and life and career skills. The goal is to develop qualified human resources in the form of independent individuals which are willing and capable of creating prosperity and possessing skills usefully required for the changes and developments of the times. The learning process is carried out based on student-centered teaching where educators are required to be able to manage learning effectively, use various learning models, employ active learning, build effective relationships with students and community, use appropriate technology and learning, and conduct a sustainable reflection on learning (Darling, 2006; Donovan & Green, 2014; Kilbane & Milman, 2014). This learning should be supported by the availability of adequate facilities and infrastructures and a learning atmosphere integrated with the community, the use of communication and infor-

mation technology, and the employment of authentic assessments (Kemendikbud, 2013).

METHOD

The research method used in this study was survey with quantitative research. Survey is a method to obtain data from a specific place naturally but the researchers conduct particular treatments for data collection, for example, distributing questionnaires, performing tests,

The research population was students of the *Paket C* program in the Province of Special Region of Yogyakarta, all numbering 2,268 students. The selction of the sample was carried out using a quota sampling technique with an error rate of 5% (Sugiyono, 2016). The sample in this study was 301 students of *Paket C* determined by observing the distribution of students studying in non-formal education units, namely the Learning Activity Center (Sanggar Kegiatan Belajar (SKB)) and CLC in 5 districts/city in Yogyakarta with 107 respondents from SKB and 194 from CLC respectively.

Table 1. The number of respondents

Class	Gender	Total
10	Female	68
	Male	67
11	Female	24
	Male	35
12	Female	53
	Male	54
Total		301

Data was collected by distributing online questionnaires either by e-mail or a Google Forms format that respondents needed to access and fill. The questionnaire was previously formulated with reference to theoretical construct which had been developed before going into reliability. Reliability was ensured by using the Cronbach alpha formula. The base for decision making was if the Cronbach alpha value is greater than (>) 0.60 then the instrument is declared reliable. The results of this test show that both 21st century learning variables, having 33 statement items, and 4C skills, consisting of 29 statement items, had values of 0.915 and 0.943 respectively. This means both research instruments were declared reliable. Meanwhile, the validity of the instrument was guaranteed by consultations with two experts specializing in non-formal education.

The collected data was selected, observed, coded, and later processed using quantitative analysis techniques by the means of SPSS version 24. Descriptive data analysis was performed to determine the frequency and variability of the data. The processed data was then classified into three categories based on the standard deviation (Azwar, 2012), namely high ($\mu + 1\sigma \leq X$), medium ($\mu - 1\sigma \leq X < \mu + 1\sigma$), and low ($X < \mu - 1\sigma$). Furthermore, the data was analyzed according to the focus of research, i.e. the effect of learning on the formation of 21st century skills, using the technique of regression analysis.

RESULT AND DISCUSSION

The result of the research is described in the following, with the focus on, first, the description on how the 21st century learning was carried out, and then the resultant effects of the 21st century learning on the development of the intended skills.

21st century learning

The following Figure 1 describes the total scores of the respondents's answers on the impartation of the 21st century learning in *Paket C* education program in Special Region of Yogyakarta. This category Figure shows that a great number of the students, 116 students or 38.5%, perceived that 21st century learning was performed in the high category. 185 students (61.8%) believed that the implementation of the 21st century learning was put in the moderate category. None of the students thought that this learning was not implemented or put in low category. This shows that the 21st century learning process in the *Paket C* equality education program already takes place, or all students experience such learning. It suffices to say that the learning conducted tries to keep up with the time, for example, the learning already utilizes internet as learning resources, etc.

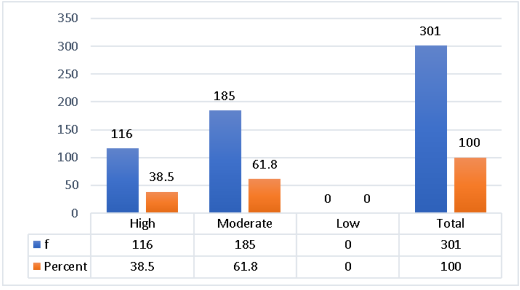

Figure 1. 21st century learning category

A more detailed view of the frequencies, based on the 21st century learning indicators, is presented in the following

Table 2. The category of 21st century learning indicators

Indicators	Category					
	High		Moderate		Low	
	f	%	f	%	f	%
Goals	247	82,1	52	17,3	2	0,7
Learners	237	78,7	64	21,3	0	0
Educators	245	81,4	55	18,3	1	0,3
Curriculum	185	61,5	115	38,2	1	0,3
Process	265	88,0	35	11,6	1	0,3
Facilities	89	29,6	209	69,4	3	1,0
Atmosphere	260	86,4	40	13,3	1	0,3
Evaluations	191	63,5	109	36,2	1	0,3

The previous table states that a considerable number of students claimed that the indicators of goals, learners, educators, curriculum, learning process, atmosphere, and evaluation were in the high category. This proves that learning in *Paket C* program is already 21st century learning-oriented. However, the component of facilities is still in the moderate category. This signifies that the 21st century learning that occurs still could not use the required facilities optimally to achieve optimal learning. This means that a facility improvement, both making those facilities available and utilizing them, is necessary.

4C Skills

The research outcome on the achievement of 4C skills of the students of the *Paket C* educational program in the Special Region of Yogyakarta, which includes the indicators of communication, critical thinking, collaboration, and creativity, is described by the following Figure 2.

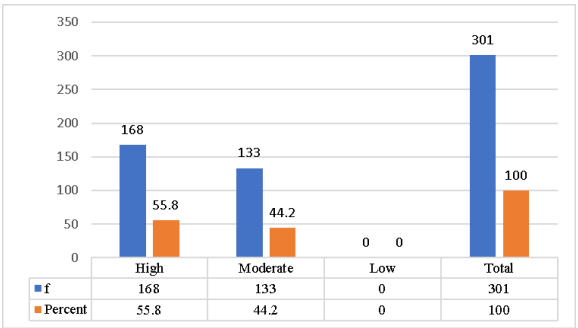

Figure 2. 4C skills of the students of Paket C

The previous table explains that students who stated 4C skills in the high category numbered 168 (55.8%), while those who said that 4C was in the medium category amounted to 133 (44.2%), and none of the students (0%) claimed the 4C implementation was in the low category. When the frequency of each category that has been mentioned was the focus, it can be seen that the 4C skills in the Special Region of Yogyakarta were included in the high category. This implies that students had 21st century abilities that were obtained through the learning process. The four abilities being discussed can be considered to be already possessed by the majority of students who took the *Paket C* equality education program. Furthermore, each 4C skill indicator is presented in detail in the following table.

Table 3. Indicators of 4C skills of Paket C students

Indicator	Category					
	High		Moderate		Low	
	f	%	f	%	f	%
Critical Thinking	243	82.1	53	17.6	1	0.3
Collaboration	271	90.0	30	10.0	0	0
Commucation	210	69.8	91	30.2	0	0
Creativity	200	66.4	101	33.6	0	0

Data presented in the table shows that all indicators are in high category. However, among those four indicators, communication and creativity are still perceived by many to belong to moderate category, in which their percentage values are 30.2% and 33.6% respectively. This is a sign that the development of those skills through attractive, constructive, and meaningful learning still becomes a challenge for educators working in equality program.

Impacts of 21st century learning to 4C skills

The following table contains data which is useful to identify whethere there is an impact of 21st century learning to 4C skills of the *Paket C* students in Special Region of Yogyakarta.

Table 4. Coefficient of determination

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826[a]	.682	.681	5.51563

a. Predictors: (Constant), Pembelajaran Abad 21

b. Dependent Variable: Keterampilan

The value of the *Adjusted R Square*, as shown by the data in the previous table, is 0.681 or 68.1%. This means that the independent variable affects the dependent variable as much as 68.1%. The rest comes from other variables not stated in the model.

The 21st-century learning in managing of the package C equality education is a must for every educational institution to organize it in order to students develop all of their potential and abilities. Each component of the education must be held in a quality manner. The results showed that all aspects of 21st-century learning according to the respondents had gone well in the indicators of goals, students, educators, curriculum, learning process, climate, and learning evaluation but in terms of facilities it was still considered moderate. This information provides an illustration that education has implemented learning based on the principle of central learning for students and considers environmental changes that must be adopted by students. This means that this shows that the non-formal education learning process is held with the aim of equipping students to adapt to rapid environmental changes (Viinikka & Uban, 2019; Donovan & Green, 2014). However, the success of the learning is strongly influenced by the availability and functioning of the learning facilities such as internet networks, computers, teleconferencing buildings, etc. As understood, one of the characteristics of this learning is that the use of communication and information technology is highly emphasized, so students need to also develop their ability to use ICT tools so that they can carry out learning effectively (Phua, Wong & Abu, 2011; Sumadi, et al., 2020). Therefore, organizers need to plan the availability and feasibility of the internet and other ICT facilities needed in the learning process of the program.

The learning process must be able to develop the knowledge, skills, and attitudes of students by educational goals. Related to it, the learning process of the program viewed by students that it has been able to equip and develop their abilities in terms of thinking, thinking, communicating, and collaboration. The results of the study show that the learning process of the program has been able to develop these abilities even though with different levels of achievement. The difference of achievement occurs because the majority of students are adults who have differences such as experience, motivation, learning style, and learning ability (Landriscina, 2009; Haselberger & Motschnig, 2011; Mavropoulosa, Pampourib & Kiriatzakoua, 2021). This difference can also occur due to the influence of a quality learning process and climate (Kim, Raza, & Seidman, 2019; Owusu-Agyeman & Larbi-Siaw, 2018) and the ability of educators to teach students (Habulezi, Batsalelwang, & Malatsi, 2017).

Judging from how the 21st century learning process affects the formation of 21st century skills for students, the results of the study show that the learning process has a significant effect on the development in question. This means that the learning in *Paket C* program has already anticipated and/or adapted to the changes in the environents. The 21st century learning in *Paket C* equality education program is in accordance with the 21st century learning framework that prioritizes the mastery of: critical thinking and problem solving, communication and collaboration skills, the ability to create and update, technology and information literacy, contextual learning abilities, and information skills and media literacy (Larson & Miller, 2012). This also conforms to the 21st century learning objectives stating that students should possess skills that are important and useful for them to be able to be more responsive to changes and today's conditions (Andrian & Rusman, 2019: Kaufman, 2013).

It is important to support the skills, so the learning process of the Paket C equity program has to be designed effectively and well planned in terms of the student aspect, curriculum, facilities, and learning evaluation are still compared to the components of objectives, processes, learning climate, and curriculum. So, some improvement actions could be carried out to optimal the forming of the skills which are include: first, to identify how 4C skills are mastered by the students. This first step means the learning process should previously identify which 21st skills are already obtained and which ones are still not mastered. Second, to foster the students's learning motivation and learning behaviours. Students should be positioned as subjects of learning, which is in line with Knowles' (1986) theory which states that students' characteristics are having their self-concepts, being an independent individual, having a wide range of experiences, having learning preparedness which orientates to their social role development tasks, being desirous of functional and immediate learning outcomes, and their learning orientation is problem-centered.

Third, the learning process must apply methods that lead the students to play an active role in the development of 4C skills. Previously, data shows that the lowest achieved skill is creativity. It shows that the applied learning approach or method needs to be improved by using the one which allows the students to recontruct their obtained knowledge into new knowledge which leads to the creation of creative products/ideas to solve an existing problem. Problem-based learning and action-based learning (learning by doing) are applicable in education by teaching students (Koroneou, Paraskeva, & Alexiou, 2013; Atun & Latupeirisa, 2020; Toheri & Haqq, 2020) using

information and communication technological advancements such as online projects, online simulations, and other online media. Finally, the availability and convenience of applying information and communication technology which supports the learning process must be accessible to students. The availability of mobile phones, social media, YouTube, and other facilities has enabled students to develop their information and communication technology literacy skills through their own self-learning process. Partnerships with stakeholders such as information companies, information and communication technology equipment suppliers, and communication consultants playing a role in the provision and use of ICT can be established for smooth learning.

Development of 4C skills is the key to successful achievement of educational goal of 4C program in regard to the information and communication technology advancements. Thus, non-formal education should issue their policies by formulating strategic steps for the development of meaningful online-based learning that is in accordance with the today's demands. At the practical level, the development of the quality of human resources, both educators and other non-formal education personnel, should be implemented with the emphasis on the improvement of the ability to the mastery of communication and information technology that supports the educational process, for example developing online modules, online tutorials, etc.

CONCLUSION

Based on the results of the research stated, it can be said that 21st-century learning can be applied in the package C education programs, students of the program have formed their 4C skills including critical thinking, creative thinking, communication skills, and collaboration, and the development of the 4C skills occurs as a result of the learning process of the century which is student-oriented. 21st century learning in order to form these skills must be optimized by carrying out planned, effective, and ICT-based learning in a rapidly changing environment. Therefore, 21st century learning development policies to build students' 4C skills need to be taken in order to realize directed learning by providing accessible ICT-based learning facilities so that students can optimize their potential and are motivated in learning.

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