Comprehension of in-service primary-science teachers toward 21st century skills: A case study on Purwakarta

H Handayani1,2*, W Sopandi1, E Syaodih1,3, A Suhandi2,4, B Maftuh1, N Hermita5, M Somantri1 and A Samsudin1

1 Program Studi Pendidikan Dasar, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi No. 229 Bandung 40154, Indonesia
2 Program Studi Pendidikan Guru Sekolah Dasar, STKIP Purwakarta, Jl. Veteran No 54 Purwakarta 54324, Indonesia
3 Program Studi Pendidikan Anak Usia Dini, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi No. 229 Bandung 40154, Indonesia
4 Departemen Pendidikan Fisika, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi No. 229 Bandung 40154, Indonesia
5 Program Studi Pendidikan Guru Sekolah Dasar, Universitas Riau, Pekanbaru, Indonesia

*hanyhandayani@stkip-purwakarta.ac.id

Abstract. Twenty-first-century skills usually are going neglected by several primary teachers (in-service teachers) in term of the learning process rather than students’ achievement. Though the implementation of information-acquisition theory this research aims to explore primary teachers’ perceptions toward 21st-century skills. The research method which was utilized as a case study with respondents was about tenth in-service primary teachers from five schools in Purwakarta city. The data were been collected through semi-structural interview and analyzed using grounded theory. The research results show that primary teachers need to comprehend 21st-century skills regarding develop primary students’ learning. Furthermore, they also explain the complexity of teachers which were facing and developing their 21st-century skills. As a consequence, this research promotes the educational training for primary teachers to develop twenty-first-century skills in primary context.

1. Introduction
The development of 21st-century skills is often overlooked in learning activities in primary school. Many teachers think that the most important things are the teaching material. It means that the achievements student score must be outstanding rather than these skills. This understanding was based
on the assumption that the learning activities is that the transmission of knowledge, where the teacher as the sender and students as recipients of knowledge [1] by OECD.

Trilling and Fadel [2] said that 21st-century skills were (1) life and career skills, (2) learning and innovation skills, and (3) Information media and technology skills. In the other hand, in the 21st century, people will be more struggles with intellectually and creatively tasks. Therefore, to face it, peoples needed to be able to assess the situation critically, creative, communicate their opinions and ideas, cooperate to each other’s and solve any problems they have by creative and innovative solutions.

However, lately awareness of the need to develop 21st-century skills in elementary school students has increased from year to year. Many academics and researchers [3 - 6] argue that developing 21st-century skills in schools is very important. Other researchers, [7 – 12], even though they did not specifically mention the development of 21st-century skills should be done since elementary school, all researchers stated the need to develop 21st-century skills such as critical thinking, creativity, communication, problem solving and collaboration skills in a learning process. Lotta [9] believes that the student's skills are indispensable when they later plunge into the community where they will work and live as a social being. Furthermore, Lotta mentioned that through integrated learning across the curriculum also able to develop 21st-century skills [9].

Although much-related research about 21st-century skills appears, the research related to teachers’ understanding of the importance of 21st-century skills in primary schools still missing. Most of the research related to the learning model that is able to improve the skills of the 21st-century skills. Therefore, this study tried to explore the perceptions of teachers about the challenge of the 21st-century skills.

2. Method
This study used a case study. The case studies selected because it allows researchers to explore in great detail the perception and the understanding of elementary school teachers about the importance of 21st-century skills as mentioned by Gable [13]. Furthermore, Gable said that in the case study method allowed researchers to compare different types of problems.

The research was conducted in Purwakarta, West Java. Purwakarta has been selected because it is one of the developed city in the province of West Java. Purwakarta is a small town that requires more attention to education development. Elementary School teacher in Purwakarta needs to elevate knowledge about how to develop 21st-century student skills.

Subjects in this study were 10 primary school teachers from the five elementary schools in Purwakarta. Two elementary schools located in remote areas, two elementary schools in urban areas, and one of the schools were the periphery city. Each school represents two teachers. The sampling technique was using snowball sampling technique [14]. So there are 10 elementary school teachers participated in this study. To protect the privacy and confidentiality of the subject, each teacher is given a fictitious name. The names of each elementary school are not mentioned, so there is no information on the subject can be tracked.

Data was collected through semi-structural interview techniques. The interview lasted for about 2 hours. After having obtained data, which is the elementary teachers' understanding about 21st-century skills, the next steps were conducted discussions with 10 teachers to check the suitability of interviews related to the understanding of elementary school teachers about the importance of 21st-century skills.

Data proceed by transcribing Interview result. Furthermore, the results of the interview transcript returned to the subject of research to ensure authenticity. Subjects have the right to remove or add the results of the transcript. After completion of the processing of the data, the next step was analyzed data by using grounded theory. The first step taken was coding the data, this encoding takes place in two stages, the coding row-by-row and coding accidentally as mentioned by Charmaz [14]. In this study, data analysis is coding transcript results of interviews conducted on a line-by-line, then we compare any results of any code, then combine all the same code into 2 themes. The findings of these themes include (1) critical thinking skills, creative and innovative, and (2) the skills of collaboration, and communication.
3. Result and discussion

3.1. Critical thinking skills, creative and innovative

The findings indicated the extent to which the teachers agreed on the importance to development 21st-century skills in elementary school. All the teachers knowing and understand the 21st century after attending the workshops. The workshop outcome used as a database for this research as Purwakarta Elementary school teacher’s understandings of 21st-century skills. When they asked, "What do you know about 21st-century skills?" Most of the teachers answer, "eager to face the challenge." Teachers know that the 21st-century skills are the ability of children to face challenges in life. However, teachers do not fully understand how to deliver it in the learning process. Especially the aspect of 21st-century skills and how to develop it in elementary school children. The quantitative data about critical, creative and innovative skills are shown in figure 1.

Figure 1. Data of critical, creative and innovative skills.

The main factor of teachers lacks on understanding the 21st Century skills is because of the lack of knowledge and information about the importance of 21st-century skill for elementary school students. 21st-century skills also refer to the goal of 21st-century national education. Almost all the teachers in this study define 21st-century skills as the ability to face any challenge through critical thinking, creative and innovative, as the following excerpt illustrates:

“…definitely, children should be able to face any challenge of the era or they vanish by it, they should able to compete by critically thinking, and create something new.” (Neneng, a teacher in elementary school A).

“... Students should be innovative, creative, and critical challenges facing the world in the era of MEA (Ceuceu a teacher in elementary school B)

“The child creativity in the 21st century, all critical thinking skills are also part of the 21st century skills ... basically able to face all the challenges of the world.” (Ujang an elementary school teacher E).

Through interviews above are found teachers not yet fully understand what the meaning of the 21st-century skills is. Mostly, teacher knowing the 21st skills as critical thinking skills, creative and innovative as a student’s skills to face the life challenges. In other words, the 21st-century skills are very important skills to have. These skills are necessary for the global challenges of the 21st century.

3.2. Communication and collaboration skills

Further findings from this research are collaboration and communication skills. In addition to teachers understanding of 21st-century skills as critical thinking skills, creative and innovative they understand
the skills of the 21st century as the student's skills in conducting cooperation and communication. Therefore, it can be concluded that the understanding of teachers about 21st-century skills are correct but still not systematic and precise as in the interview excerpts below and figure 2 for quantitative one.

"... I understand that 21st-century skills are the skills of cooperation and the child's ability to express opinions to compete in this global era ...." (Cecep an elementary school teacher D)

".. 21st-century skills were the ability of children to cooperate in groups so that they can socialize with the environment ". (Enok an elementary school teacher E)

**Figure 2. Communication and collaborative skills data.**

Based on the interview above shows that teachers interpret the 21st-century skills as the child's ability to collaborate and communicate opinion or ideas that they have. These 21st-century skills have an important role in the learning objectives in elementary school. The 21st century is an era of knowledge (knowledge age), [15 - 17] states that all efforts to fulfill the necessities of life in various contexts is based to knowledge, including knowledge-based education, knowledge-based economy, knowledge-based social empowerment, and knowledge-based industry, In line with this Liao [11] states that a new challenges which requires breakthrough thinking process if the target is the output quality, able to compete in globalization era.

Based on the data above, we can conclude that the teacher's knowledge about the skills of the 21st century was limited. After we repeat the interview about how they develop critical thinking, creative and innovative skills in elementary students, most of them answered that they have not fully implemented it because they think that the more important things are to deliver the materials on time. The following excerpt of the interview.

"I do not fully develop the skill in my class, because I have lots of teaching materials and we were racing against the time to finish it, for me it is more important than others ... “(Ceuceu a teacher in elementary school B)

"... we know that the development of critical thinking skills, creative and innovative has to be done in the class, but on the other hand, amount of teaching materials should be delivered to student on time, so sometimes we forget about it, but actually we know and like, but if the material is not conveyed, what a poor student ...” (Ujang a teacher the SD E)

The results showed that the learning process not yet encourage critical thinking skills, creative and innovative elementary school student’s skills. The learning activities are dominated by teachers only, students only play the role of learning that is very passive, and students are not stimulated to conduct and resolve the problem so that their thinking skills develop optimally.

Despite the fact that the teachers think that they have an obligation to delivered material toward students, teachers do not understand the importance of developing critical thinking skills, creative and innovative children early. In one interview, one teacher explained that teachers need all the training
related to the development of 21st-century skills. All teachers expect to have the ability to choose the model and implement learning activities that can develop 21st-century skills in their class, as is evident from the following interview.

“... the point is that we need a training about the development of 21st century skills that can facilitate us in how to deliver material and simultaneously develop students' thinking skills, so we were able to bring out the new generation that could face challenges of the times....” (Neneng an elementary school teacher A)

The views above explain how the teacher wants all the students to have the critical thinking skills, creative and innovative. In general, the students, in a class are divided into three groups, clever or quick learner, and a group of moderate and slow group learner. From These three categories, the moderate group is lots than others. Based on these findings, teachers must have the ability to choose the models, media and teaching resources in accordance with the abilities and needs of their students.

4. Conclusion
The findings of this study indicate the teacher’s misconception about the 21st-century skills. In general, all the teachers in this study understand and agree with the importance of the development of 21st-century skills in elementary school. The findings of this study indicate teachers are still difficulties in developing 21st-century skills to the elementary school students. They have difficulties in implementing 21st-century skills in the class; however, they have a desire and keep trying to understand and develop it. The research discovered two important skills in the development of 21st-century skills, which are critical thinking, creative and innovative skills, and communication and collaboration skills. Based on the results of this study is also found several factors that are a barrier for teachers to develop the 21st-century skills of students in the learning process. There was a science lesson is too much so that teachers focus on the completion of teaching materials, primary school teachers have difficulty in determining the learning model, that can assist them in developing 21st-century skills and they need training about to the development of 21st-century skills in elementary school.

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