Toward society 5.0: Indonesia and Japan on the 21st century literacy skills

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Abstract. Ever since its declaration in 2016 by the Japanese government, the society 5.0 concept has been largely adopted by global communities. It is argued that to implement the concept successfully, the research and the teaching of foundational skills like numeracy, literacy, or ICT at the elementary school level should be mandatory. This article reports the research and the teaching of the 21st literacy skills of Japan and Indonesia in the past four years (2016 - 2020). We reviewed the research and the teaching of 21st century skills at the elementary education level in both countries. The research databases used to search the literature were Google Scholar, ERIC, Education Abstracts, PsycINFO, and Social Sciences Citation Index. The inclusion criteria used to sort the studies were literacy skills/elementary/Japan/Indonesia/digital literacy/information literacy/ITS literacy and limited to studies that were done from 2016 – 2020. After reviewing ten studies, this pilot systematic review study preliminary found that open-access studies on the 21st literacy skills in Japan’s elementary school were restricted, so it was harder to find than studies that discussed similar topics in the Indonesian context. Existing studies in Japan at the elementary level prioritize the research and the teaching of literacy skills of information, ICT, and foreign language literacies. In contrast, studies in Indonesia focus on basic, scientific, and foreign language literacies.

Keywords: Society 5.0, Indonesia, Japan, literacy skills

1. Introduction
Elementary education provides foundational or basic skills like numeracy and literacy skills that are highly needed to support sustainable development. Studies found that early literacy acquisition determined students' success in their higher levels of education [1, 2]. With the recent intensifying involvement or integration of technology into education and in the industry, the word literacy has been largely extended, reshaped, and redefined.

Formerly identified as the ability to read and write, literacy in the 21st century is now used to address in an overlapping manner with information literacy, multiple literacies, new literacies, and digital literacy that later define the 21st century literacy skills. The 21st century literacy skills are a significant part of the 21st century skill framework published by the Organization for Economic Co-Operation and Development (OECD) in 2008 [3]. The frameworks are learning and innovation skills like critical thinking and problem solving, creativity and innovation, and communication and collaboration. Second,
information, media, and technology like information literacy, media literacy, and ICT Literacy. For this article, this second framework is defined as 21\textsuperscript{st} century literacy skills. The last framework is the life and career skills like flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility. As one integral framework, the three components complement and support one another. For example, the foundational 21\textsuperscript{st} century skills that involve information, media, and technology literacy need to be addressed as important matters.

To support the spread of those skills globally, the OECD emphasizes the creation of a support system that will push the construction of a skilful or smart society that is ready to face the challenges in the 21\textsuperscript{st} century has to offer. The support system includes standards and assessment, curriculum and instruction, professional development, and learning environments (see Figure 1) stipulated mostly by formal schools. At schools, the successful implementation and the teaching of the 21\textsuperscript{st} century skills such as information literacy, media literacy, and ICT literacy are measured by the success in their learning environment, professional development of the teachers, curriculum and instruction, and the standards and assessment.

![Figure 1. 21\textsuperscript{st} Century Support Systems.](Source: OECD)

Japan has long been recognized as a leading nation in technology application at school, industry, and the daily life. Thus, once the country launches its Society 5.0 concept amidst the development of Industry 4.0, global communities respond positively to the idea, trusting that the country has what it takes to succeed with the plan.

This article aims to articulate the review of studies on the teaching and learning of the 21\textsuperscript{st} century skills in both Japan and Indonesia to learn how both countries perform and develop the 21\textsuperscript{st} century literacy skills at the elementary level. Despite the 99\% adult literacy rate in Japan and 95\% in Indonesia in 2018, it is still a curious case whether the gaps in information literacy, media literacy, and ICT literacy between Japan and Indonesia are that wide apart. This research is a pilot of a literature review on literacy skills’ education and research in Indonesia and Japan. As part of a larger study on Indonesia’s literacy behavior and skills in the 21\textsuperscript{st} century, it is expected that some comparative data on the 21\textsuperscript{st} literacy skills will shed light on the research methods and the foci of literacy skills’ teaching and learning in Indonesia’s context.
2. Method
This is a pilot of an extensive systematic review study of the teaching and research of 21st literacy skills in Japan and Indonesia. Around 50 journal articles, doctoral dissertations, and reports have been collected. The full analysis of the articles will be available by the end of 2020. In this section, the data collection from the systematic literature review will be explored. Even though the study data were collected by means of the systematic review, for this article, a narrative and comparative literature review would be used to report the comparison of ten studies on the teaching and research of literacy issues in Japan and Indonesia. The systematic review is a method of making sense of large bodies of information to identify what works and what does not [4]. Thus, in this systematic review of literature, this article is started with a clear purpose statement or research questions, clear search parameters, and inclusion and exclusion criteria.

2.1 Research question
This pilot study was guided by the following question: “what do the available studies from Japan and Indonesia reveal about the priorities of the research and teaching of the 21st literacy skills at elementary school levels in both countries?”

2.2 Search parameters
The first step of data collection was a broad search of the literature to gather a pool of academic articles from two countries. To do so, an exhaustive systematic search of the literature was done on Google scholar, ERIC, Education Abstracts, PsycINFO, and Social Sciences Citation Index. This broad search that began in February 2020 – May 2020 resulted in 50 references. The keywords used in searching for the literature were: 21st century literacy skills; Japan; Indonesia; elementary schools; digital literacy; information literacy; and ICT literacy. Only studies published in English were included in the analysis.

2.3 Criteria for inclusion and exclusion
These are several established criteria used before examining the references. First, to be included in the systematic review, a document was a report of an empirical study, both qualitative and quantitative. Hence, some theoretical reviews were excluded. Second, the documents reported teachers’ classroom research or empirical research done by university faculties. Third, the studies explicitly mentioned the contexts of their studies and participants. Fourth, the studies were conducted at the elementary level of education in both countries. Fifth, the studies were open-access studies. Sixth, the studies were published from 2016 until 2020. The year of 2016 became the pivotal year since it was the year that the Japanese government announced the Society 5.0 paradigm. Another selection criterion is on the participants. This study focuses only on studying and critiquing the research and the teaching in mainstream classes.

3. Findings
3.1. The research and teaching of the 21st literacy skills in Japan and Indonesia
There are five articles written in the Japanese context of elementary school literacy education. The first one is a study entitled “Can Earlier Literacy Skills Have a Negative Impact on Future Home Literacy Activities? Evidence from Japanese”. The authors examined whether there was a relationship between Home Literacy Environment (HLE) with literacy skills in Japanese and whether factors like genders, parents’ education, and children's literacy performance would moderate the relations. They found that more educated parents adjusted their involvement in their children's literacy skills, while less-educated parents did not. Based on the finding, they highlighted the need for parents to be sensitive to their children's performance. They acknowledged that the studies on HLE in the Japanese context were rare. From 1986 – 2016, there were only three studies that they cited as looking into the HLE or family literacy issues. One of the reasons for the lack of studies, according to authors, was that basic literacy and family literacy issues were mostly done at the kindergarten level, not at the elementary level. They
claimed that their study was unique because there were never any studies in the Japanese context that had studied gender and parents' education in supporting students' literacy acquisition [5].

The second study from Japan is entitled "What Did Students Learn in Programming Workshops? Comparison of Students' Reports from Two Programming Workshops in Japan". The research was motivated by the fact that programming subjects would be formally offered at elementary schools in Japan by 2020. Thus, he conducted two programming workshops that he did in an elementary school. In one group, he guided students to create their projects with "Scratch", a graphical programming environment, and the other group used a small programmable computer called "Cricket". In the workshops, students made their robots and toys. The workshops were held in an elementary school classroom in Japan as a part of its school curriculum. He described in detail the activities that he had with both groups of students. He also gathered students' reflections on the workshops. He found that the students were more focused on programming in the Scratch workshop and more on various topics in the Cricket workshop because they invested more effort on making physical objects [6].

The third study from Japan is a study comparing the implementation of a tool called B2i, a tool used to verify students' information skills in France with its resemblance in Japan that is called Information Moral Teaching model curriculum (IMT). It was a document analysis study by comparing the content as well as the implementations of both approaches. Both of the models of information were offered starting from elementary level up to senior high school. They both had five domains. The researcher compared each of the five domains and illustrated his explanations with samples. Table 1 shows the five domains for each model [7].

| B2i                                      | IMT                                      |
|------------------------------------------|------------------------------------------|
| Recognizing the information environment  | An ethnic of information society         |
| Adopting a responsible attitude          | Understanding and complying with the laws on information system |
| Creating, producing, treating, and exploring data | A wisdom for safety about information system |
| Reading, searching, and discovering      | Information security                     |
| Exchanging and communicating             | Establishing public information society  |

The comparative analysis found some of the components that were not covered in the IMT model. The author found that the IMT model emphasized the ill-effects to pupils' health when they use computers and information networking for a long time.

The fourth study from Japan reported the implementation, or the try-out of software called Role Playing Game (RPG) to teach English to grade 5, 1, and 2 students. With the software, the authors asked five children to comment and give free descriptions. The authors gathered the students' experience with the questionnaire. They analyzed the ratio of the correct answer given by students after using RPG, which was a diagnostic test of their English competency. The authors emphasized the significance of the software in bringing a fun element to language competency testing [8].

The fifth study did not have elementary students as participants. Instead, they reported findings on the acceptance and struggles of science preservice elementary teachers in using ICT for teaching. The study was survey study on teachers' ICT instruction capabilities that was based on five competencies: the ability to use ICT for teaching preparation and assessment, ability to use ICT for teaching, ability to teach students to use ICT, ability to teach information ethics, and the ability to use ICT for school administrative. The authors found that first, the teachers' ICT instruction capabilities and students' awareness of trial lessons with ICT were influenced by their experience in using ICT during the teaching practice session. Second, the preservice teachers became gradually confident after the teaching practice session [9].

The five studies of the teaching and research of literacy skills in Japan showcased different types of literacy that seem to matter in the context of Japanese elementary schools: ICT literacy, basic literacy
of Japanese language, digital literacy, digital and foreign language literacy, and information literacy. Although it was acknowledged, a special note needed to be made on the dearth of articles that studied basic Japanese literacy at the elementary level. Professional development for teachers seems to be another issue that is addressed quite seriously. Surveys on the teacher’s ability to use ICT in supporting their teaching were conducted to provide supports for preservice teachers. This pilot review also provides important information on how the Japanese government prioritizes students’ health in their model of information literacy at the elementary level, despite other information literacy skills needed.

The five studies conducted in Indonesian classrooms also represent issues that seem to be important in elementary education. First of all, a study entitled, "Level of ICT literacy: The Ability of Elementary School Teachers to Use ICT Investigation in Cimahi” analyzed the level of ICT literacy of elementary school teachers based on gender and age. The authors found that most of the Indonesian elementary teachers surveyed were at level 2 of 6 levels. Based on gender and age, they found no significant difference between the ability of male and female teachers and that the younger teachers have a higher level of ICT ability. In comparison to the study by [9], this study aimed only to map the elementary teacher’s ability in a rural area in Indonesia. This study showcased the gap between the ICT ability in rural areas with the teachers in urban areas [10].

The second study from Indonesia tried to find the effects of discovery learning using ICT in bamboo conservation topics on students' language and scientific literacy. The analysis showed differences in language and scientific literacy skills in students who were taught using discovery learning with ICT media and students who were taught using a conventional approach with visual media. They suggested that the discovery learning model be adopted with ICT media because scientific literacy could be developed through the understanding ability or part of language literacy. ICT media could attract students' attention by creating an active and pleasant learning atmosphere. This study highlighted three literacy skills: ICT, Media, and scientific literacy at elementary levels. This study did not seem to hesitate to use three big terms in one single study comparative study [11].

Like [11], the article by [12] explored the validity, practicality, and effectiveness of textbooks as well as teach scientific literacy skills of students on a certain topic. The analysis showed that the book showed practicality by 92.66% and the effectiveness at 90%. The authors concluded that the textbook was valid, practical, and effective, so it could be used to teach science literacy skills. In the Indonesian context, textbooks are still widely used at the elementary level of education. Thus, this study only portrays what other studies have investigated the production and the use of textbooks in the country [13].

The fourth study from Indonesia was done by [14]. The study introduced a new term of literacy with its root in cultural and critical studies: critical literacy. Unlike the critical thinking skill introduced by the 21st century skill framework, critical literacy refers to how English teachers view texts and teach students how to read texts critically from equity or social justice perspectives. The author found that the English teachers in their study were often left with little knowledge or experience on the term and how to develop this approach in their class. The author concluded with suggestions for English teachers to develop a critical literacy-oriented classroom.

The last study by [15] explicitly referred to the use of the 21st century skill framework in elementary school, where she implemented the whole framework and the Four Cs of the learning skills, namely critical thinking and problem-solving, communication and collaboration, creativity and innovation, and digital literacy skills. The author expects that she had modeled the integration of the framework in Indonesian elementary school.

Like the studies carried out in Japanese elementary schools, the studies in Indonesia represent identical characteristics rooted in the culture and the contexts of Indonesia. However, there are some points of similarities that we share. First, both of our studies seem to concern about improving and maintaining the quality of our teachers. Second, we are both concerned about the teaching of foreign language literacies and how they would help accelerate our elementary students’ learning.

There are some literacy skills that the Indonesian elementary schools need to learn from the Japanese elementary schools, i.e., the inclusion of programming and the information literacies.
3.2. The characteristics of the studies on literacy education done in both countries.
The studies, as mentioned earlier from Japan, were done by using diverse methodologies to answer the inquiries. For example, the study by [5] used a fairly complicated cross-lagged path analysis to find the relationship between parents’ teaching with students’ progress in literacy acquisition that bridge the home literacy practices and those of schools. The research involved 142 children from grade 1 until their grade 2 and 142 parents. The study by [6] used a case study method to report his teaching programming activities in two different groups of students who used different programming platforms. He described his process of teaching and recorded students’ responses to the experience. This study did not perform a strong data analysis in its quantitative (survey) and qualitative (observation) manners. However, in terms of content, the author showed meticulous preparation, teachings, and assessment of his programming lessons. Table 2 shows the characteristics of ten literacy studies in Japan and Indonesia.

Table 2. Characteristics of ten literacy studies in Japan and Indonesia.

| No | Authors and year of study | Methods of Inquiry | Data collection methods | Country |
|----|--------------------------|--------------------|-------------------------|---------|
| 1  | Inoue, Georgiou, Muroya, Maekawa, and Parrila, 2018 | Quantitative | Questionnaire for parents | Japan |
| 2  | Mori, 2016 | Qualitative | Case study - Observations | Japan |
| 3  | Sunaga, 2019 | Qualitative | Document analysis | Japan |
| 4  | Fukuchi and Kanayama, 2016 | Qualitative | User experience - Observation | Japan |
| 5  | Fujitani, Kitazawa, and Fukumoto, 2019 | Quantitative | Survey | Japan |
| 6  | Kristiyani, 2019 | Qualitative | Case study – observation | Indonesia |
| 7  | Islami, Abdullah, Hakim, Widiaty, Latif, Juhana, Amelia, and Putra, 2019 | Quantitative | Survey | Indonesia |
| 8  | Utaminingsih and Ibrahim, 2018 | Quantitative | Experimental – Pre and Post test | Indonesia |
| 9  | Gustine, 2018 | Quantitative | Survey | Indonesia |
| 10 | Winarni, Hambali, and Purwandari, 2020 | Quantitative | Experimental and survey | Indonesia |

Sunaga did a policy and document analysis on two information literacy models used in France and Japan. The author then provided feedback to the Japanese model based on his comparative analysis of the two models. It was quite similar to what Utaminingsih and colleagues did when developing and examining a strategy-based textbook that was trial-tested at a 5th grade elementary school in Surabaya, Indonesia. The same class had to do a pre-test and post-test assessment. The research instrument included a form of sheet validation, observation sheet of implementation lesson plans, and science literacy test. The textbook based on scientific strategy was valid with the mode in terms of components.

A software called Role Playing Game (RPG) to teach English to grade 5, 1, and 2 students was used [8]. With the software, the authors asked five children to comment and give free descriptions. In line with [8], Gustine introduced and tried out the critical literacy concept to a group of English teachers and taught them how to use it in the English classes [14]. In [8], they tried to endorse the use of a software game, while Gustine introduced a concept. The difference in the tools used to teach may portray a lifestyle and may actually portray the social-economic conditions of both contexts of studies.
4. Conclusion
The ten studies were chosen. The first top five studies appeared on Google Scholar. They were open-access articles. They identified some preliminary, inconclusive characteristics of the literacy studies, and teaching done in both countries. It was hard to find studies on the development of literacy skills in the Japanese context. It may be caused by a different level of education that both countries have. The other reason may be the studies of elementary level literacy published more in Japanese than in English. Second, when it comes to developing the literacy skills at the elementary level, the five studies in both Indonesia and Japan portray concerns on implementing their understanding of 21st century literacy skills. Thus, a deeper understanding of the cultural contexts of the study needs to be considered in the systemic literature review.

References
[1] Suggate S, Schaughency E, McAnally H and Reese E 2018 From infancy to adolescence: The longitudinal links between vocabulary, early literacy skills, oral narrative, and reading comprehension Cognitive Development 47 82–95.
[2] Hamilton L G, Hayiou-Thomas M E, Hulme C and Snowling M J 2016 The home literacy environment as a predictor of the early literacy development of children at family-risk of dyslexia Scientific Studies of Reading 20 401–419.
[3] 21st century skills: How can you prepare students for the new global economy. Available from: https://www.oecd.org/site/educeri21st/40756908.pdf
[4] Jesson J, Matheson L and Lacey F M 2011 Doing Your Literature Review: Traditional and Systematic Techniques (Sage)
[5] Inoue T, Georgiou G K, Muroya N, Maekawa H and Parrila R 2018 Can earlier literacy skills have a negative impact on future home literacy activities? Evidence from Japanese Journal of Research in Reading 41 159–175
[6] Mori H 2016 What did students learn in programming workshops? Comparison of students' reports from two programming workshops in Japan Proceedings of the 6th Annual Conference on Creativity and Fabrication in Education pp 103–106
[7] Sunaga K 2019 Information literacy in France and Japan Qualitative and Quantitative Methods in Libraries 6 209–216
[8] Fukuchi K and Kanayama K 2016 RPG active learning software to evaluate the literacy of children Conference Proceedings: ICT for Language Learning
[9] Fujitani S, Kitazawa T and Fukumoto T 2019 Role of trial lessons and teaching practice to develop skills for utilizing ICT in science education EdMedia+ Innovate Learning pp 1940–1944
[10] Islami A R, Abdullah A G, Hakim D L, Widiaty I, Latif M A, Juhana A, Amelia N and Putra D E 2019 Level of ICT literacy: The ability of elementary school teachers to use ICT investigation in Cimahi Journal of Physics: Conference Series 1375 012096
[11] Winarni E W, Hambali D and Purwandari E P 2020 analysis of language and scientific literacy skills for 4th grade elementary school students through discovery learning and ICT media International Journal of Instruction 13 213–222
[12] Utaminingsih S and Ibrahim M 2018 The development of textbook based approach to teach scientific literacy at 5th grade 2nd International Conference on Education Innovation (ICEI 2018)
[13] Parlingduan F, Rifai I, and Safriani A 2018 The representation of Indonesian cultural diversity in middle school English textbooks Indonesian Journal of Applied Linguistics 8 289–302
[14] Gustine G G 2018 A survey on critical literacy as a pedagogical approach to teaching English in Indonesia Indonesian Journal of Applied Linguistics 7 531–537
[15] Kristiyani C 2019 Implementing the school curriculum in the framework of the 21st century skills in Indonesian context Social Science and Humanities Journal 3 1211–1221