Why 6 Cs?
The Urgency of Learning at Elementary School

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ABSTRACT
Science and technology continue to develop and bring about changes and new orders in various fields of human life, including the education system. The implication is that current learning practices must be oriented towards learning following the demands of human competence in the 21st century. This study aims to obtain information about 21st century skills that are important to implement in elementary school classrooms. The method used is a systematic literature review of a number of data related to 21st century skills. The results show that six skills must be instilled in elementary schools, character, critical thinking, creativity, citizenship, collaboration, and communication, so-called the 6 Cs. The 6 Cs are important because elementary school students must be equipped with various skills to have more complex skills, have mastery of technology, and understand information in a globalized world. This research impacts the availability of information about the 6 Cs for elementary school students and opens opportunities for further research on the use of appropriate methods and learning media, and conditions learning environments to develop 6Cs in elementary schools as a whole.

Keywords: the 6 Cs, the 21st century skills, elementary school

1. INTRODUCTION
Science and technology continue to develop and have brought changes and new orders to various fields of human life. Along with the changing times, the education system has also changed [1]. In fact, technology has radically changed teaching and learning practices [2]. So at this time, learning practices carried out in elementary schools must also be oriented towards learning in accordance with the demands of human competence in the 21st century.

Since 2013, the Indonesian government has enacted the 2013 Curriculum, which has a philosophical foundation as a curriculum that underlies the development of various student potentials so that the national education objectives can be achieved, namely to become quality Indonesian human beings. Good quality education, strong and resilient character, and high competence will impact overcoming and fulfilling new needs, challenges, and demands in various fields of life [3].

This study aims to obtain information about 21st century skills that are important to inculcate in elementary school classrooms. This study is important because today's students must be prepared to face the increasing complexity of life and work in the 21st century [4]. Key skills that are very important in the 21st century include cognitive and noncognitive skills [5]. These competencies can also be in the form of knowledge, skills, attitudes, and other attributes that can help children and youth to reach their full potential [6]; [7]; [1].

Concerning the implementation of 21st century learning, four important rules must be implemented. They include (1) learning must be student–centered, (2) learning must be done collaboratively, (3) learning must have context, and (4) learning must be integrated with the community [8].

1.1. 21st Century Skills
Much attention has been paid to the importance of 21st century skills since entering the 90s. The 21st century learning paradigm emphasizes developing student competencies that are in accordance with the demands of the 21st century. 21st century skills and competencies are competencies and skills that young
people must possess to become effective workers and citizens in society [9]. The emergence of 21st century skills was initiated by the existence of a three-part foundation issued by The Secretary’s Commission On Achieving Necessary Skills [10], then enGauge 21st century learning skills by the North Central Regional Educational Laboratory (NCREL) [11].

Further identification of the deepest competencies and skills most needed in the 21st century is called the 4Cs (The Four Cs) [4]. Furthermore, a formula for 21st century skills are called 3 Rs x 7 Cs = 21st Century Learning [12]. 21st century skills are also divided into 10 sections and four categories, from now on, referred to as the Assessment and Teaching of 21st Century Skills (ATC21S) [13].

Then based on new pedagogies for deep learning (NPDL) with learning outcomes in the form of Six Cs of Deep Learning [14]. Furthermore, there are 6 Cs of Education for the Future [15]; there are eight competencies in the Ministerial Order on Student Learning [16]: 6 Cs [17] skills 5 C’s [18]; and ISTE standards for students to prepare students of this century so that they can prepare themselves in the ever-evolving world of technology [19].

### Table 1 The 21 Century Skills

| Source | 21 Century Skills |
|--------|-------------------|
| [10] a three-part foundation | Basic Skills Reading, Writing Arithmetic/ Mathematics Listening, Speaking |
| Thinking Skills Creative Thinking Decision Making Problem Solving Seeing things in the mind’s eye Knowing how to learn Reasoning |
| Personal Qualities Responsibility Self-Esteem Sociability Self-Management Integrity/ Honesty |
| [11] enGauge Skills Inventive thinking Adaptable, managing complexity, and self-direction Curiosity, creativity, and risk-taking Higher-order thinking and sound reasoning |
| High productivity Prioritizing, planning, and managing for results Effective use of real-world tools Ability to produce relevant, high-quality products |
| Effective communication Teamwork, collaboration, and interpersonal skills Personal, social, and civic responsibility Interactive communication |
| Digital-age literacy Basic, scientific, economic, and technology literacies Visual and information literacies Multicultural literacy and global awareness |
| [4] P21 Skills Learning and innovation skills Critical thinking and problem solving Creativity and innovation |
| Career and life skills Flexibility and adaptability Initiative and self-direction Social and cross-cultural interaction Productivity and accountability Leadership and responsibility |
| Learning and innovation skills Communications and collaboration |
| Digital literacy skills Information literacy Media literacy ICT literacy |
Based on the analysis of the development of 21st century skills in Table 1, it can be concluded that the six 21st century skills need to be developed in the practice of learning in elementary schools. The six skills include Character, Critical thinking, Creativity, Citizenship, Collaboration, and Communication (hereinafter referred to as the 6 Cs). Whereas, the ICT literacy in this study is not included because it is the part of multiliteracy that has another focus discussion.

This study is important because elementary school is a formal education pathway [21]. Elementary school is a systematic process to develop the basic intellectual, social, personal, and character abilities based on national values. So that elementary school students should also be given space to develop 21st century skills, especially 6 Cs.

Previous research related to the 21st century and skills and competencies in primary education shows special attention to skills and competencies related to information and communication, technological developments, globalization, and the need for innovation [22]. Here is the following explanation about the 6 Cs that must be instilled in elementary schools in the 21st century.

### Table 2. The 21 Century Skills (Continued)

| Source | 21 Century Skills |
|--------|-------------------|
| [13] ATC21S | Ways of thinking Critical thinking, problem-solving, decision making; Creativity and innovation; Learning to learn, Metacognition | Living in the world Citizenship – local and global; Life and career; Personal and social responsibility - including cultural awareness and competence | Ways of working Collaboration (teamwork) | Tools for Working Information literacy |
| [14] NDPL 6 Cs | Character Critical thinking | Citizenship | Collaboration |
| [15] 6 C’s | Think critically Develop creativity | Embrace Culture Work collaboratively Communicate clearly Utilize connectivity |
| [16] Personal growth and well being | Critical thinking Problem-solving Creativity and innovation | Cultural and global citizenship Collaboration | Managing information Communication |
| [17] 6 Cs | Content Critical Thinking Creative Innovation | Confidence Collaboration Communication |
| [18] 5 C’s | Critical thinking Creative thinking | Citizenship Collaboration Communication |
| [19] ISTE Standard for students | Empowered learner Knowledge constructor Innovative designer | Digital Citizen Global collaborator Creative communicator Computational thinker |
| Result | Character Critical thinking Creativity | Citizenship Collaboration Communication ICT literacy |

### 3.1. Character

Good character cannot be formed automatically but must be developed through a learning process, exemplary, and practiced continuously from time to time through character education [23]. Character education must act as a knowledge intermediary, so what must be done is to repackage information in an effective way to accept changes that can be made in teacher training and education policy [24]. Character education programs can help students learn the importance of community in their schools [25].

In Indonesia, the development of character education at the elementary school level is implemented in "Profil Pelajar Pancasila” (see Figure 1. retrieved from [26]). Students who have a profile as a result of education focus not only on cognitive aspects but also on attitudes and behavior that are in accordance with the identity of the nation and citizens of the world [27].
Critical thinking is the key in preparing students to live and work in the 21st century and as a basis for effective learning [28]. Someone who has critical thinking skills will be very helpful when he analyzes information, solve problems systematically, produce innovative solutions, plan strategically, think creatively, and presents his work or ideas to others in a way that is easy to understand [29]. Critical thinking skills are very important for students because this plays a role in developing students' thinking skills [30].

3.3. Creativity

Creativity is one of the most important skills for achieving success in the 21st century [31]. Student creativity can be built through various conditions of the learning environment, such as combining creativity in the classroom, having the opportunity to choose, imagining and exploring, providing motivation to learn, and using creativity as a means to achieve learning goals [32]. Student creativity cannot be built in a traditional passive classroom in which the students only imitate the teacher without question. According to the Victorian Early Years Learning and Development Framework, creativity should be built by involving students in learning and allowing students to choose and make decisions [33]; students also must be open to any idea, dare to take a risk, and be able to adapt to all changes [34].

3.4. Citizenship

Currently, citizenship education following global standards is needed and reflected in the curriculum objectives [35], which can be empowered through knowledge, skills, and values to assist in taking action, to overcome social, political realities, culture, and the interconnected world [36]. Therefore, students must be prepared for work and a sustainable economy and must be equipped with skills and values, strong personal development, and responsible citizenship in living life on the 21st century [37].

3.5. Collaboration

Learning with a good collaborative environment and strong teacher collaboration abilities will lead to high learning achievement [38]. Collaboration is also associated with a number of other important learning outcomes, namely critical thinking, metacognition, and motivation [39]. However, collaboration has a low effect on the learning motivation of elementary school students [40], but in learning, collaboration can have a strong effect, especially for students who have low learning achievement [39].

3.6. Communication

Students in elementary school must be prepared to be good communicators. Students must have mastery and fluency in digital communication, writing, and speaking [14]. The results of The Met Life research [41] show that effective communication and collaboration skills and skills in using technology and skilled social media will enable collaboration with other groups internationally. Thus, teachers must facilitate so that students in elementary schools can develop students' communication skills. This activity can be done through learning planning, choosing learning methods, dividing student study groups, being an example in communicating, providing opportunities for active students to ask and express opinions, paying attention to passive students, and giving awards to active students [42].

4. CONCLUSION

The analysis results show that there are six skills must be embedded at elementary schools, it is character, critical thinking, creativity, citizenship, collaboration, and communication, referred to as the 6 Cs. The 6 Cs in elementary schools can be instilled through conditioning the learning environment, 6 Cs-oriented learning planning, group division in learning, the application of innovative learning models, the use of interactive ICT-based learning media, the participation of teachers as role models, and the provision of attention and rewards for students. This research contributes to the availability of information about the 6 Cs and opens opportunities for further research on the use of appropriate methods, learning media, and conditioning of learning environments to develop 6Cs in elementary schools as a whole.
ACKNOWLEDGMENTS

This publication is funded by the Ministry of Education, Culture, Research and Technology, the Directorate General of Higher Education, Research and Technology of the Republic of Indonesia in the Program Talenta Inovasi Indonesia 2021.

REFERENCES

[1] Ontario, *Phase 1: Towards Defining 21st Century Competencies for Ontario 21st Century Competencies: Foundation Document for Discussion*, vol. 5. Ontario, 2016.

[2] S. K. W. Chu, R. B. Reynolds, N. J. Tavares, M. Notari, and C. W. Y. Lee, *21st Century Skills Development Through Inquiry-Based Learning*. Singapore: Springer Nature, 2016.

[3] Kemendikbud, *Konsep dan Pedoman Penguatan Pendidikan Karakter*. Pusat Analisis dan Sinkronisasi Kebijakan Sekretariat Jenderal Kementerian Pendidikan dan Kebudayaan, 2017.

[4] Partnership for 21st Century Learning, *The MILE Guide Milestones For Improving Learning & Education*. Arizona: The Partnership for 21st Century Skills, 2009.

[5] National Research Council, *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, DC: The National Academies Press., 2012.

[6] OECD, "The definition and selection of key competencies: executive summary: DeSeCo project," pp. 1–20, 2005. [Online]. Available: https://www.researchgate.net/publication/269092638_The_definition_and_selection_of_key_competences_executive_summary_DeSeCo_project.

[7] CEDEFOP, *Terminology of European education and training policy*, Second. Luxembourg: Publications office of the European union, 2014.

[8] J. R. Nichols, “4 Essential Rules Of 21st Century Learning,” 2019. Available: https://www.teachthought.com/learning/4-essential-rules-of-21st-century-learning/.

[9] K. Ananiadou and M. Claro, “21st century skills and competences for new millennium learners in OECD countries,” 2009. [Online]. Available: http://dx.doi.org/10.1787/218525261154.

[10] SCANS, “A SCANS,” 1991. [Online]. Available: https://repository.up.ac.za/bitstream/handle/2263/64096/LaPlaca_How_2018.pdf?sequence=1.

[11] C. Lemke, “enGauge 21st Century skills: Digital literacies for a digital age,” Illinois, 2002. [Online]. Available: https://eric.ed.gov/?id=ED463753.

[12] B. Trilling and C. Fadel, “Bernie Trilling, Charles Fadel-21st Century Skills_ Learning for Life In Our Times -Jossey-Bass (2009),” *J. Sustain. Dev. Educ. Res.*, vol. 2, no. 1, p. 243, 2009.

[13] M. Binkley et al., “Defining Twenty-First Century Skills,” in *Assessment and Teaching of 21st Century Skills*, P. Griffin, B. McGaw, and E. Care, Eds. Springer Dordrecht Heidelberg London New York: Springer Science, 2012, pp. 17–66.

[14] M. Fullan and G. Scott, “New Pedagogies for Deep Learning Whitepaper: Education Plus,” Collaborative Impact, Washington, 2014. [Online]. Available: www.newpedagogies.org.

[15] B. S. Miller, “The 6 C’s Squared Version of Education in the 21st Century,” *Accretive Media*, 2015. https://www.bamradionetwork.com/the-6-c-s-squared-version-of-education-in-the-21st-century/.

[16] Alberta Education, “Competencies: Descriptions, Indicators and Examples,” 2016. [Online]. Available: https://education.alberta.ca/media/3272998/competency-indicators-september-30-2016.pdf.

[17] R. M. Golinkoff and K. Hirsh-Pasek, *Becoming Brilliant: What Science Tells Us About Raising Successful Children*. Washington, DC: American Psychological Association, 2016.

[18] Virginia Department Of Education, “Virginia’s 5 C’s Virginia is for Learners,” *Virginia Department of Education*, 2019. https://www.virginiaisforlearners.virginia.gov/medi-library/ (accessed Aug. 31, 2021).

[19] ISTE, “ISTE Standards for Students,” *International Society for Technology in Education (ISTE)*, 2021. https://www.iste.org/standards/for-students.

[20] C. Okoli, “A Guide to Conducting a Standalone Systematic Literature Review,” *Commun. Assoc. Inf. Syst.*, vol. 37, no. 1, pp. 879–910, 2015, doi: 10.17705/1cais.03743.

[21] UU No 20, *UNDANG-UNDANG REPUBLIK
INDONESIA NOMOR 20 TAHUN 2003 TENTANG SISTEM PENDIDIKAN NASIONAL. 2003.

[22] A. Chalkiadaki, “A Systematic Literature Review of 21st Century Skills and Competencies in Primary Education,” Int. J. Instr., vol. 11, no. 3, pp. 1–16, 2018, doi: 10.12973/iji.2018.1131a.

[23] A. Pala, “the Need for Character Education,” Int. J. Soc. Sci. Humanit. Stud., vol. 3, no. 2, pp. 23–32, 2011.

[24] D. I. Walker, M. P. Roberts, and K. Kristjánsson, “Towards a new era of character education in theory and practice,” Educ. Rev., vol. 67, no. 1, pp. 79–96, 2015, doi: 10.1080/00131911.2013.827631.

[25] A. Lin, “Citizenship education in American schools and its role in developing civic engagement: a review of the research,” Educ. Rev., pp. 37–41, 2013, doi: 10.1080/00131911.2013.813440.

[26] Kemendikbud, “Profil Pelajar Pancasila - Pusat Penguatan Karakter,” Web page, 2021. https://cerdasberkaraktar.kemdikbud.go.id/?page_id=2817.

[27] Kemendikbud Ristek, Panduan Pengembangan Projek Pengunaan Profil Pelajar Pancasila. Jakarta: Pusat Asesmen dan Pembelajaran Badan Penelitian dan Pengembangan dan Perbukuan Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2021.

[28] M. A. Ab Kadir, “An inquiry into critical thinking in the Australian curriculum: examining its conceptual understandings and their implications on developing critical thinking as a ‘general capability’ on teachers’ practice and knowledge,” Asia Pacific J. Educ., vol. 38, no. 4, pp. 533–549, 2018, doi: 10.1080/01887912.2018.1535424.

[29] D. Alban, “Why Critical Thinking Is Important (& how to improve it) | Be Brain Fit,” Be Brain Fit & Blue Sage, 2020. https://bebrainfit.com/critical-thinking/ (accessed Mar. 06, 2019).

[30] S. Mahanal, S. Zubaiddah, I. D. Sumiati, T. M. Sari, and N. Ismirawati, “RICOSRE: A learning model to develop critical thinking skills for students with different academic abilities,” Int. J. Instr., vol. 12, no. 2, pp. 417–434, 2019, doi: 10.29333/iji.2019.12227a.

[31] D. Henriksen, P. Mishra, and P. Fisser, “International Forum of Educational Technology & Society Infusing Creativity and Technology in 21st Century Education: A Systemic View for Change Published by: International Forum of Educational Technology & Society Infusing Creativity and Technology in,” J. Educ. Technol. Soc., vol. 19, no. 3, pp. 27–37, 2016.

[32] R. A. Beghetto and J. C. Kaufman, “Classroom contexts for creativity,” High Abil. Stud., vol. 25, no. 1, pp. 53–69, 2014, doi: 10.1080/13598139.2014.905247.

[33] A. Michalopoulou, “Inquiry-Based Learning through the Creative Thinking and Expression in Early Years Education,” Creat. Educ., vol. 05, no. 06, pp. 377–385, 2014, doi: 10.4236/ce.2014.56047.

[34] Nurhadi, R. Abas, Erni, Yuliana, and Hamrina, “Implementation of Inquiry Based Learning to Improve Understanding the Concept of Electric Dynamic and Creative Thinking Skills ( An empirical study in Class IX Junior High School Students State 4 Kendari ),” Int. J. Sci. Res., vol. 5, no. 3, pp. 471–479, 2016.

[35] S. Zahabioun, A. Yousefy, M. H. Yarmohammadian, and N. Keshhtiaray, “Global citizenship education and its implications for curriculum goals at the age of globalization,” Int. Educ. Stud., vol. 6, no. 1, pp. 195–206, 2013, doi: 10.5539/ies.v6n1p195.

[36] L. Guo, “Preparing Teachers to Educate for 21st Century Global Citizenship: Envisioning and Enacting,” J. Glob. Citizh. Equity Educ., vol. 4, no. 1, pp. 1–23, 2014.

[37] D. V. J. Bell, “Twenty-first century education: Transformative education for sustainability and responsible citizenship,” J. Teach. Educ. Sustain., vol. 18, no. 1, pp. 48–56, 2016, doi: 10.1515/jtes-2016-0004.

[38] M. Ronfeldt, S. O. Farmer, K. McQueen, and J. A. Grissom, Teacher Collaboration in Instructional Teams and Student Achievement, vol. 52, no. 3. 2015.

[39] E. R. Lai, “Collaboration : A Literature Review Research Report,” 2011. [Online]. Available: https://images.pearsonassessments.com/images/tmrs/Collaboration-Review.pdf.

[40] H. E. Vidhergor, “Effects of digital escape room on gameplay experience, collaboration, and motivation of elementary school students,” Comput. Educ., vol. 166, no. January, p. 104156, 2021, doi: 10.1016/j.compedu.2021.104156.
[41] M. Tichenor and J. Tichenor, “Collaboration in the Elementary School: What Do Teachers Think?,” *J. Curric. Teach.*, vol. 8, no. 2, pp. 54–61, 2019, doi: 10.5430/jct.v8n2p54.

[42] S. Zubaidah, “Keterampilan Abad Ke-21: Keterampilan Yang Diajarkan Melalui Pembelajaran,” in *Seminar Nasional Pendidikan*, 2016, vol. 2, no. 2, pp. 1–17.