International Journal of Elementary Education
Volume 7, Number 4, Tahun 2023, pp. 731-741
P-ISSN: 2579-7158 E-ISSN: 2549-6050
Open Access: https://doi.org/10.23887/ijee.v7i4.66570

Profile of Students' 21st Century Skills in Digital Learning Using The Contextual Teaching and Learning (CTL) Model

Atika Ulya Akmal[1*], Yohandri[2], Abdul Razak[3]

[1] Elementary School Teacher Study Program FIP, Universitas Negeri Padang, Padang, Indonesia
[2,3] Physical Education FMIPA, Universitas Negeri Padang, Padang, Indonesia

ARTICLE INFO

Article history:
Received September 22, 2023
Accepted November 10, 2023
Available online November 25, 2023

Kata Kunci:
CTL Model, Keterampilan Abad 21, Pembelajaran Digital

Keywords:
CTL Model, The 21st Century Skills, Digital Learning

ABSTRAK

Keterampilan abad 21 adalah keterampilan yang sangat perlu dikembangan untuk mengadapi zaman digitalisasi sekarang ini. Melihat kondisi sekarang, keterampilan abad 21 pada mahasiswa belum terlalu menonjol dan kurang berkembang dengan baik sehingga mahasiswa membutuhkan inovasi baru yang dapat menunjang keterampilan 4C demi menjadi pribadi yang siap untuk mengahadapi persaingan di era global ini. Tujuan penelitian ini adalah untuk menganalisis bagaimana profil keterampilan abad 21 mahasiswa Pendidikan Guru Sekolah Dasar semester 1 pada matakuliah konsep dasar fisika SD. Jenis penelitian ini adalah penelitian deskriptif. Sampel penelitian ini berjumlah 110 mahasiswa yang dipilih dengan tujuan tertentu atau dengan teknik purposive sampling. Teknik pengumpulan data yang digunakan adalah angket, wawancara, dan observasi. Data dianalisis menggunakan deskriptif statistik yang akan menunjukkan persentase banyaknya mahasiswa per kategori yaitu kategori di bawah standar, mendekati standar dan sesuai standar. Hasil penelitian ini menunjukkan untuk keterampilan berfikir kreatif, kolaborasi dan komunikasi persentase mahasiswa pada kategori mendekati standar. Sedangkan untuk keterampilan berpikir kreatif persentase mahasiswa berada pada kategori dibawah standar. Kesimpulan penelitian ini adalah profil keterampilan abad 21 mahasiswa pada pembelajaran digital dengan CTL berada pada status mendekati standar yang baik, kecuali pada keterampilam berpikir kreatif masih membutuhkan beberapa perlakuan ekstra untuk meningkatkannya.

ABSTRACT

The 21st century skills are skills that really need to be developed to face the current digitalization era. Looking at the current conditions, students' 21st century skills are not very prominent and are not well developed so that students need new innovations that can support 4C skills. The purpose of this study was to analyze the 21st century skill profile of first semester Elementary School Teacher Study Program students in the elementary physics basic concepts course. This type of research is descriptive research. The sample of this research was 110 students selected with a specific purpose or by purposive sampling technique. The data collection techniques used are questionnaires, interviews, and observation. The data were analyzed using descriptive statistics which would show the percentage of the number of students per category. The results of this study indicate that for creative thinking skills, collaboration and communication the percentage of students is in the near standard category. As for creative thinking skills, the percentage of students is in the substandard category. This shows that students' 21st century skills still need to be improved. learning activities that facilitate the emergence of 21st century skills need to be carried out continuously or continuously so that students are accustomed to and achieve the desired standards. The conclusion of this study is that students' 21st century skill profiles in digital learning with CTL are in a status close to a good standard, except for creative thinking skills that still require some extra treatment to improve them.

1. INTRODUCTION

In the contemporary 21st century, education is more crucial than ever to make sure kids have learning and innovation skills, information technology and media literacy abilities, and the ability to work and thrive using their life skills (Andriana et al., 2022; Fajri et al., 2021). The essential competencies required in the 21st century are learning and innovation competencies, including critical thinking and problem-solving competencies, communication and cooperation competencies, and creative and innovation competencies (Baroya, 2018; Karmila et al., 2023). Among abilities connected to the use of literacy, media, and information and communication technology (ICT), skills in mastering media, information, and technology (ICT) are the second skill that is the emphasis of 21st century learning. The third skill is life and career, which includes adaptable and flexible life skills, initiative and independence,

*Corresponding author.
E-mail addresses: atikaulyaakmal@fip.unp.ac.id (Atika Ulya Akmal)

the ability to interact socially across cultural boundaries, productivity and accountability, as well as a leadership mindset and a feeling of accountability (Jufriadi et al., 2022; Marfiana & Ramadan, 2021).

Information and communication technology advancements have altered human lifestyles in terms of employment, socializing, and studying. These technological developments have affected many facets of society, including schooling. In the twenty-first century, both educators and students must possess teaching and learning skills. To survive in this information age's knowledge age, one must confront a variety of chances and problems (Husain & Kaharu, 2020; Sole & Anggraeni, 2018). There are 4 competencies in the 21st century skills known as "4C" namely (1) Critical Thinking, (2) Communication, (3) Collaboration, and (4) Creative Thinking (Indarta et al., 2021; Muhali, 2019). The use of technology in the classroom is a requirement for educators and students to meet the standards for 21st century or digital century learning (K. P. Dewi et al., 2023; Rahayu et al., 2022). In order to prepare students for life in the digital age, educators must be able to apply their subject-matter expertise, technological know-how, ability to support advanced-level learning experiences, creativity, and innovation in digital learning contexts (Gjelaj et al., 2020; Marnita et al., 2023).

Students in the 21st century learning concept are expected to possess a number of qualities, including as the capacity for teamwork, the capacity for critical and creative thought, the capacity for independent learning, the capacity for effective use of technology, and the capacity for change (Prayogi, Rayinda Dwi; Estetika, 2019; Taufiqurrahman, 2023). Students in the twenty-first century should be able to think transdisciplinary and tackle complicated challenges. In order to examine and comprehend material in the proper context, students must also be able to think contextually (Taufiqurrahman, 2023; Trilling & Fadel, 2009). With these abilities, it is anticipated that students would be able to successfully manage their time, think globally, and navigate the technology and apps used in the learning process while remaining dedicated to the process.

Looking at the current conditions, students' 21st century skills are not too prominent and not well developed so that students need new innovations that can support 4C skills in order to become individuals who are ready to face competition in this global era. It is supported by previous study who say that 21st century skills cannot be developed properly if the learning used is monotonous and seems boring (Redhana, 2019). This is caused by the shift in the era which is influenced by digitalization which is very popular with students. The same thing was also expressed by other study most of the learning that is carried out is learning that is still teacher-centered. As a result, students cannot master 21st century skills optimally (Indarta et al., 2021). Therefore, learning reform that shifts from teacher-centered learning to learner-centered learning is the answer to efforts to develop 21st century skills in students. Learning can be assisted with interesting innovations, one of which is the use of technology or what is often referred to as digital learning.

According to the findings, there is a discrepancy between current expectations and what actually happens in the field, particularly when it comes to students' 21st century talents. When researchers interview students, it is evident that the pupils lack effective communication skills. Both their speaking and their answer-development skills are lacking in students. Students also acknowledge that they frequently choose to keep quiet to debate and correct anything that is incorrect. This indicates that kids lack strong critical thinking abilities. The fact that some students choose to work alone while studying and participating in group discussions was also observed. Because students were still listeners and recipients of information during learning, the average student said that they did not have adequate abilities based on the results of the 21st century skills questionnaire. Only students who talk or choose to speak are engaged in learning when students are passively learning or choose to remain silent. Additionally, students admitted that learning wasn't as personal to them. students today are frequently exposed to digital technology. Students expressed interest in digital learning since it gives them the opportunity to develop their skills.

Digital learning often known as e-learning, is a type of technology information that is used in the field of education and takes the shape of virtual worlds. The phrase "digital learning" is more specifically meant to refer to an effort to convert the educational system in schools or colleges into a digital format that is connected through Internet technology (Sulasmi, 2022; Suryani et al., 2019). To add innovation in digital learning, this research integrates it with a learning model, namely Contextual Teaching and Learning (CTL). CTL-based digital learning is implemented by providing digital books arranged in such a way based on the settings on the CTL learning model. This digital book is expected to be able to have a huge positive impact on students' 21st century skills (Sulistiani, 2020; Yani et al., 2021).

The relationship between CTL and 4C skills, namely students' critical thinking skills is seen when evaluating information sources and deepening information literacy skills, students' creativity skills are seen when generating innovative solutions and improving ideas, student communication skills are seen when they become capable communicators and utilize technology to reach a wide audience. target,

student collaboration skills can be seen, that is, with problem solving activities through analysis, synthesis, evaluation will provide an authentic view of learning (Muhali, 2019; Septikasari & Frasandy, 2018). The use of the CTL model has several steps, namely: constructivism, inquiry, questioning, learning community, modeling, reflection, and authentic assessment (Sulistiani, 2020; Welerubun et al., 2022).

This study is innovative in that it combines digital learning with the CTL learning paradigm to examine students' 21st-century skill profiles. In contrast to earlier studies, this one examines students' 21st century competencies using both digital learning and traditional learning paradigms. like the study done by Shifan Thaha Abdullateef on applying digital learning to build 21st century abilities. In this study, it was established that the use of digital learning tools can enhance student abilities. This study reveals that when choosing digital tools to improve 21st century skills, crucial factors should be taken into account (Thaha Abdullateef, 2021). Based on their findings, researchers want to combine digital learning with the CTL learning model, a model that is familiar to students. The goal of this research is to increase students' 21st-century abilities and suggest future researchers' next moves. This research was conducted on first semester students majoring in elementary school teacher education in the basic concepts of physics course. Based on the description above, this study aims to analyze the 21st century skill profile of 1st semester Elementary School Teacher Study Program students at Padang State University in the elementary physics basic concepts course. The profile is used as information needed to develop ways to train 21st century skills for students, so this research is important to do.

2. METHOD

Descriptive research is what this study is. Research that describes and responds to inquiries about a phenomena or event that occurs is known as descriptive research (Gainau, 2021). The primary goal of descriptive research is often to precisely explain the facts and qualities of the thing or subject being examined (Restu, H.R. Marwan Indra Saputra, Aris Triyono, 2021; Tersiana, 2018). Therefore this research is intended to get an overview or profile of students' 21st century skills in digital learning (digital books) that are integrated with the CTL model.

The sample of this study was 110 first semester PGSD students at Padang State University who were selected with a specific purpose or purposive sampling technique. The instrument used is a questionnaire or questionnaire. The data were analyzed using descriptive statistics which would show the percentage of the number of students per category, namely the category below standard, close to standard and according to standard. The instrument grid is presented in Table 1.

Table 1. The 21st Century Skills Questionnaire Grid

21st Century Skills	Indicator	Item Number
Creative Thinking Skills	1. *Fluency* 2. *Flexibility*) 3. *Originality* 4. Detailing skills	1,3, 6, 8, 12, 16, 20
Critical Thinking Skills	1. analysis 2. Synthesize 3. Problem Solving 4. Summing up 5. Evaluation	2, 7, 10, 14, 18, 24, 25
Communication Skills	1. Formulate and express ideas 2. Listen to information effectively 3. Using a variety of technological resources 4. Selection of diction	4, 8, 11, 12, 17,21
Collaboration skills	1. Open in discussion 2. Not being selfish 3. Troubleshooting 4. Support team decisions	5, 9, 13, 15, 19, 22, 23

The purpose of this 21st century skills survey is to gather data on the level of students' 21st century competencies. The abilities in question are critical thinking, communication, teamwork, and creative thinking. A Likert scale was used to evaluate this questionnaire. The nature of the remarks in the questionnaire, whether positive or negative, can be used to assess the quality of the students' responses. Table 2 shows the Likert scale rating.

Table 2. Likert Scale Criteria

Answer Choices	Positive	Negative
Yes	3	1
Sometimes	2	2
No	1	3

Student surveys on 21st century abilities must adhere to a number of requirements in order to get appropriate assessment findings. Test reliability and validity are regarded as minimum standards. Each question in the survey was deemed valid based on the validity test findings, which showed that rcount > rtable ($\alpha = 0.05$) had been obtained. The acquired reliability test scores were 0.63, falling into the strong category. The 21st century skills questionnaire can be used when this test is finished.

3. RESULT AND DISCUSSION

Result

This research begins by analysing indicators for each of the 21st century skills. The following are indicators for 21st century skills as show in Table 3.

Table 3. Indicators of 21st Century Skills

21st Century Skills	Indicator
Creative Thinking Skills	1. Fluent thinking a. Spark many ideas, answers, problem solving or questions. b. Gives lots of ways or suggestions for doing things. c. Always think of more than one answer. 2. Think flexibly a. Generate ideas, answers or questions that vary. b. Can see a problem from different points of view. c. Looking for many alternatives or different directions. d. Able to change the way of approach or way of thinking. 3. Think rationally (originality) a. Able to give birth to new and unique expressions. b. Think of unconventional ways to express yourself c. Able to make unusual combinations of parts or elements. 4. Detailing skills a. Able to enrich and develop an idea or product b. Adding or detailing the details of an object, idea or situation to make it more interesting
Critical Thinking Skills	5. Analyze Separating materials or concepts into component parts so that the organizational structure can be understood 6. Synthesize Putting together elements or parts in such a way as to form a unified whole 7. Solve the problem Solve the problem so that the right result is obtained 8. Conclude Identify and secure the information needed to draw conclusions 9. Evaluate Assess, compare, conclude, contrast, and describe
Communication Skills	10. Formulate thoughts, ideas that are communicated verbally and non-verbally 11. Listen effectively to understand the meaning of the person communicating, including information, values, attitudes, and culture 12. Using a variety of technological resources and media effectiveness and impact management 13. Adjust the language used when interacting with others
Collaboration Skill	14. Give or receive feedback from each team member 15. Share responsibility in presenting results effectively 16. Help manage conflict and be active in group discussions

21st Century Skills	Indicator
	17. Supports group decisions.

Based on the research that has been done, the percentage of students per category for each skill is shown in Figure 1

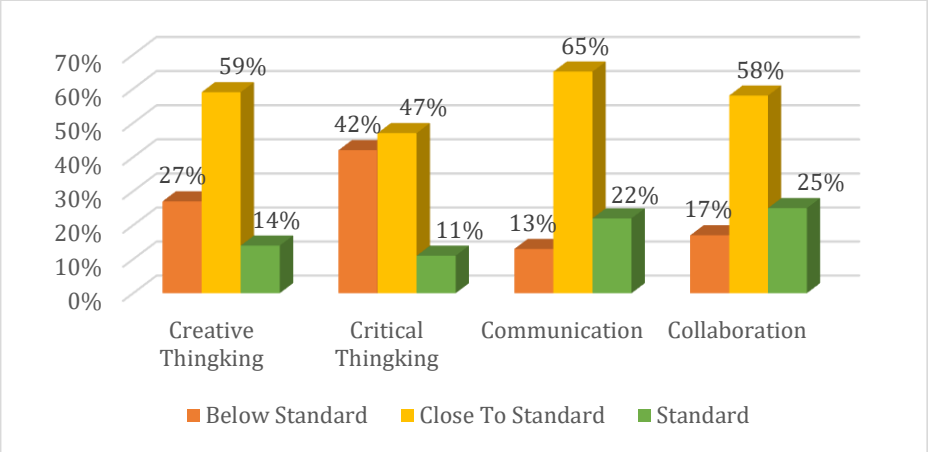

Figure 1. 21st Century Percentage Acquisition of Each Skill Graph

Based on the observation results, the lowest student skill is critical thinking skills, as can be seen from Figure 1 which shows the highest percentage of understandard categories. This is caused by students not being able to analyze in depth the topics or problems they face so that students do not understand the points they are going to work on. Critical thinking is supported by sufficient prior knowledge of students so they can see the effect of an element from all perspectives and make the right decision.

Creative Thinking Skills (Creative Thinking)

The results of observing creative thinking skills for each indicator are shown in Table 4.

Table 4. Percentage Gain Results for Each Indicator of Creative Thinking Skills

Indicator	Category	Number of Students
Fluent thinking	Under Standard	36
	Close to Standard	44
	Standard Compliant	30
Think flexibly	Under Standard	29
	Close to Standard	55
	Standard Compliant	26
Rational thinking (originality)	Under Standard	47
	Close to Standard	66
	Standard Compliant	8
Detailing Skills	Under Standard	32
	Close to Standard	61
	Standard Compliant	17

Base on Table 4, the skills of 21st century students in the aspect of creative thinking are that most students have skills close to standard. This is shown by the average results of the indicators for each category, namely 31 students or 28% of students have below standard skills, 57 students or 51% of students have skills close to standard and 20 students or 18% of students have standard skills.

Critical Thinking Skills (Critical Thinking)

The results of observing critical thinking skills for each indicator are shown in Table 5.

Table 5. Percentage Results for Each Critical Thinking Skills Indicator

Indicator	Category	Number of Students
Analyze	Under Standard	53

Indicator	Category	Number of Students
Synthesize	Close to Standard	41
	Standard Compliant	16
	Under Standard	49
	Close to Standard	29
Solve the problem	Standard Compliant	22
	Under Standard	39
	Close to Standard	32
Conclude	Standard Compliant	39
	Under Standard	48
	Close to Standard	42
Evaluate	Standard Compliant	20
	Under Standard	52
	Close to Standard	50
	Standard Compliant	8

Base on Table 5, the skills of 21st century students in the aspect of critical thinking are that most students have substandard skills. This is shown by the average results of the indicators for each category, namely 49 students or 43% of students have below standard skills, 39 students or 35% of students have skills close to standard and 21 students or 19% of students have skills according to standard.

Communication Skills (Communication)

The results of observing communication skills for each indicator are shown in Table 6.

Table 6. Percentage Gain Results for Each Indicator of Communication Skills

Indicator	Category	Number of Students
Formulate thoughts, ideas that are communicated verbally and non-verbally	Under Standard	21
	Close to Standard	66
	Standard Compliant	27
Listen effectively to understand the meaning of the person communicating, including information, values, attitudes, and culture	Under Standard	12
	Close to Standard	54
	Standard Compliant	44
Using a variety of technological resources and media effectiveness and impact management	Under Standard	9
	Close to Standard	67
	Standard Compliant	34
Adjust the language used when interacting with others	Under Standard	19
	Close to Standard	80
	Standard Compliant	11

Base on Table 6 show the skills of the 21st century students in the communication aspect are that most of the students have close to standard skills. This is shown by the average results of the indicators for each category, namely 15 students or 14% of students have below standard skills, 67 students or 61% of students have skills close to standard and 29 students or 26% of students have skills according to standard.

Collaboration skills (Collaboration)

The results of observing collaboration skills for each indicator are shown in Table 7.

Table 7. Percentage Gain Results for Each Collaboration Skills Indicator

Indicator	Category	Number of Students
Give or receive feedback from each team member	Under Standard	16
	Close to Standard	73
	Standard Compliant	21
Share responsibility in presenting results effectively	Under Standard	6
	Close to Standard	87
	Standard Compliant	17
Help manage conflict and be active in group	Under Standard	13
	Close to Standard	68

Indicator	Category	Number of Students
discussions	Standard Compliant	29
Supports group decisions	Under Standard	42
	Close to Standard	54
	Standard Compliant	14

Table 7 shows the skills of the 21st century students in the aspect of collaboration are that most of the students have skills close to standard. This is shown by the average results of the indicators for each category, namely 19 students or 17% of students have below standard skills, 71 students or 65% of students have skills close to standard and 20 students or 18% of students have skills according to standard.

Discussion

First, Creative Thinking Skills (Creative Thinking). In this skill, students are quite capable of using their creativity and innovation, both in designing solutions and in finding sources of information. Students are able to follow an understanding of the goals of innovation as well as the needs and interests of the target problems given in the project. That is, students can consider other parties who might benefit from the designs made. When collecting information, most students use various types of information sources that can be reached. Some students are able to find other ways or alternatives that are able to solve the problems they face without changing the meaning of the intended answers. Student creativity can be seen when students submit several offers of solutions that they will take when solving problems. Students can see problems from different points of view and bring together perspectives that are close to solutions to make it easier for them to express ideas and ideas in solving these problems. In the table above it can be seen that students' creative thinking skills have the highest value on the indicatorthink fluently. This means that students are able to come up with many ideas, answers, solve problems or questions, be able to provide many ways or suggestions for doing various things and think of more than one answer.

According to previous research, digital learning has a statistically significant and favorable effect on creative thinking skills both directly and indirectly, and students will need these skills throughout their lives to keep up with the times (Kesici, 2022). Students were interested in learning about digital technology, according to another finding of the study done by previous study the use of digital learning can effectively increase students' overall competence (Wang & Burdina, 2023). According to other research, students can easily obtain the material they require for learning when there is a digital learning component (Henriksen et al., 2018). The most crucial component in the development of creativity is information. It is simple to understand how having access to fresh and interesting material can spark an original thought. It can easily use anything you are looking for to assist creative thinking to find solutions to the issues you are encountering. The ability of digital technology to give people access to the information they require while still being supported by a sufficient internet network is also readily apparent (Qureshi et al., 2021; Sailer et al., 2021; Sousa et al., 2022). The students can easily use it to find solutions to the issues you are encountering, whatever it is that you are seeking for to boost creative thinking.

Second, Critical Thinking Skills (Critical Thinking). In this skill, most students do not recognize the main part of the project to be completed and do not see problems from different perspectives. So that in making details of things that are needed in general or not in a complex manner. The main cause is that students are not used to learning that requires them to think critically. Most of the students also thought that they could not properly understand the problems given. When students make questions that focus on physics topics, students are already able to create and ask questions about topics or things needed but have not delved deeper. This has an effect on when students collect and evaluate information from several sources to answer the questions given. Students are not able to combine information from various sources and students do not really know what is needed to answer questions, and the information collected is too little. Students often find it difficult when synthesizing information or assembling elements or parts in such a way as to form a unified whole which results in making wrong conclusions.

Due to learning constraints, the development of 4C abilities in the 21st century is still significantly hindered, but educators are working to improve 4C skills through inventive, creative learning activities and collaborative learning with students (Monika et al., 2022). The assessment, analysis, and self-regulation sub-skills were the least mastered by students when compared to other critical thinking sub-skills, according to another study, which found that students' critical thinking abilities were in the low group (Basri & As' ari, 2019). According to Riyanto's research, interactive genomic flipbooks built using the Aurora 3D Animation Maker and Anchored instruction learning models can help students develop their critical thinking skills (Riyanto et al., 2020). This demonstrates how, when done independently and deliberately, digital learning may help students' critical thinking abilities. As opposed to this study, which

examined four student skills concurrently. input for additional research to concentrate on a single ability in order to maximize the outcomes. In this study, digital learning has made a respectable contribution to students' cognitive abilities, approaching the ability benchmark.

Third, Communication Skills (Communication). In this aspect, students are quite able to communicate well the information or ideas they have. When students engage in discussions about solving problems and what is needed, most students are already able to express their opinions in the form of information, inventions, ideas and others but not yet clearly, concisely and logically. There are times when students participate in discussions but their group mates do not understand the intended line of thought. This is also because students are still trying to participate in discussions using the appropriate language. Even though most of the students spoke clearly, at some times it was still unclear. In addition, students also speak with a loud intonation even though it is still monotonous. In the interviews conducted, the reason students could not answer clearly and completely was because students did not go deep into problem solving in their groups.

This is corroborated by study who found that communication skills and student problem-solving abilities had a positive link in the medium category with a correlation coefficient value of 0.50. Communication abilities contribute 25% (Makiyah et al., 2021). This demonstrates how crucial effective communication skills are to the growth of student competency. These results are corroborated by studies who discovered that as students' communication abilities advance, so does their academic performance. This is demonstrated by the considerable improvement in academic performance of the students following the teacher's interpersonal communication training (Ariyani & Hadiani, 2020).

Digital learning can improve the effectiveness of teaching and learning processes and outcomes, according to research information is now more easily accessible than ever before because to digitalization (Tohara, 2021). This makes it possible for pupils to study whenever and wherever they want. Students and students find it simpler to study thanks to the freedom that digitalization gives, particularly in the area of communication (Claro et al., 2018; Tvenge & Martinsen, 2018). Digital learning is thought to be able to facilitate more student communication and activity. Digital media can be used by students to test their abilities in inventive and creative communication (Coffelt et al., 2019; Liu et al., 2020). As can be shown from student grades that are in line with standards, this research has made a significant contribution to student communication abilities, which may have an effect on communication skill improvement.

Fourth, Collaboration skills (Collaboration). In collaboration skills, students are able to divide work well which can make work in groups more effective. This is shown in the majority of students who make a list of tasks to divide tasks among members in detail so that they are followed properly. In addition, students assign roles but and follow them. Students are able to work well together in order to find a suitable solution to solve the problems they face. When students help solve problems, some other students give suggestions to their groups and consider together whether the suggestions are suitable or not. Students also build tolerance when conveying ideas and do not prioritize personal decisions, but instead discuss what solutions they will take.

In sharing responsibility when presenting results effectively, students have tried to use their abilities. In addition, students also carry out their assignments separately so that they become effective and the assignments will be combined back into one unit, of course with discussions to revise or criticize the results of the assignment. Students discuss to receive and give feedback, students are polite and kind in acknowledging and respecting the views of their group mates.

Previous study state the same thing, claiming that collaborative learning has been shown to be successful for children. Therefore, it is envisaged that collaborative learning will be used with students at many levels of education, from primary school to higher institutions, in order to help students improve their collaboration skills and make education even better (A. P. Dewi et al., 2020). Students' answers when learning, which are creative, active, and sensitive to their learning needs, reveal that the influence of 21st century learning has a substantial impact on the development of their 4C skills (Afdareza et al., 2020; Tohani & Aulia, 2022).

The research's strength is how it interprets 21st century abilities (creativity, critical thinking, teamwork, and communication) while using digital learning and the CTL learning paradigm. This study is an update that makes use of the CTL learning paradigm. Digital tools that can aid in student learning achievement are used in the CTL model's learning process. Previous studies that are pertinent and make references to the same concepts provide support for this research. The profile of students' 21st century skills after undergoing digital learning utilizing the CTL paradigm clearly demonstrates the research's significance. This is evident from the students' pre- and post-learning standard outcomes in the study that was conducted. During conversations, students are drawn to the CTL learning paradigm and utilization of

digital learning. Students are consequently engaged in their education and highly motivated to find solutions to the difficulties presented.

4. CONCLUSION

From the discussion of the research, it can be said that there are still students lacking in 21st century skills in every aspect, with that of course there is a need for follow-up so that students can have skills that reach standards. The results showed that for creative thinking skills, collaboration and communication the percentage of students was in the near standard category. As for creative thinking skills, the percentage of students is in the substandard category. This shows that students' 21st century skills still need to be improved. learning activities that facilitate the emergence of 21st century skills need to be carried out continuously or continuously so that students are accustomed to and achieve the desired standards.

5. REFERENCES

Afdareza, M. Y., Yuanita, P., & Maimunah, M. (2020). Development of learning device based on 21st century skill with implementatiton of problem based learning to increase critical thinking skill of student on polyhedron for grade 8th junior high school. *Journal of Educational Sciences*, *4*(2), 273–284. https://doi.org/10.31258/JES.4.2.P.273-284.

Andriana, E., Fauzany, P. S. D., & Alamsyah, T. P. (2022). 21st Century Multimedia Innovation: Development of E-LKPD Based On Scientific Inquiry in Science Class. *Journal of Innovation in Educational and Cultural Research*, *3*(4), 731–736. https://doi.org/10.46843/jiecr.v3i4.242.

Ariyani, E. D., & Hadiani, D. (2020). Hubungan Pola Keterampilan Komunikasi Interpersonal dan Prestasi Akademik Mahasiswa. *JSHP : Jurnal Sosial Humaniora Dan Pendidikan*, *4*(2), 141–149. https://doi.org/https://doi.org/10.32487/jshp.v4i2.849.

Baroya, E. H. (2018). Strategi Pembelajaran Abad 21. *As-Salam: Jurnal Ilmiah Ilmu-Ilmu Keislaman*, *1*(1), 101–115. https://doi.org/http://journal.stai-yamisa.ac.id/index.php/assalam/article/view/28/19.

Basri, H., & As' ari, A. R. (2019). Investigating Critical Thinking Skill of Junior High School in Solving Mathematical Problem. *International Journal of Instruction*, *12*(3), 745–758. https://eric.ed.gov/?id=EJ1220211.

Claro, M., Salinas, A., Cabello-Hutt, T., San Martín, E., Preiss, D. D., Valenzuela, S., & Jara, I. (2018). Teaching in a Digital Environment (TIDE): Defining and Measuring Teachers' Capacity to Develop Students' Digital Information and Communication Skills. *Computers and Education*, *121*, 162–174. https://doi.org/10.1016/j.compedu.2018.03.001.

Coffelt, T. A., Grauman, D., & Smith, F. L. M. (2019). Employers' Perspectives on Workplace Communication Skills: The Meaning of Communication Skills. *Business and Professional Communication Quarterly*, *82*(4), 418–439. https://doi.org/10.1177/2329490619851119.

Dewi, A. P., Putri, A., Anfira, D. K., & Prayitno, B. A. (2020). Profil Keterampilan Kolaborasi Mahasiswa pada Rumpun Pendidikan MIPA. *Pendagogia Jurnal Ilmu Pendidikan*, *18*(01), 57–72. https://doi.org/https://doi.org/10.17509/pdgia.v18i1.22502.

Dewi, K. P., Ismaniati, C., & Murti, R. C. (2023). One-Gate Digital Archive for Elementary School Digitalization. *Journal of Innovation in Educational and Cultural Research*, *4*(1), 81–88. https://doi.org/10.46843/jiecr.v4i1.425.

Fajri, I., Yusuf, R., Zailani, M., & Yusoff, M. (2021). Model Pembelajaran Project Citizen Sebagai Inovasi Pembelajaran Dalam Meningkatkan Keterampilan Abad 21. *Jurnal Hurriah: Jurnal Evaluasi Pendidikan Dan Penelitian*, *2*(3), 105–118. https://doi.org/10.56806/jh.v2i3.30.

Gainau, M. B. (2021). *Pengantar Metode Penelitian*. PT Kanisius.

Gjelaj, M., Buza, K., Shatri, K., & Zabeli, N. (2020). Digital Technologies in Early Childhood: Attitudes and Practices of Parents and Teachers in Kosovo. *International Journal of Instruction*, *13*(1), 165–184. https://doi.org/https://doi.org/10.29333/iji.2020.13111a.

Henriksen, D., Henderson, M., Creely, E., Ceretkova, S., Černochová, M., Sendova, E., Sointu, E. T., & Tienken, C. H. (2018). Creativity and Technology in Education: An International Perspective. *Technology, Knowledge and Learning*, *23*(3), 409–424. https://doi.org/10.1007/s10758-018-9380-1.

Husain, R., & Kaharu, A. (2020). Menghadapi Era Abad 21: Tantangan Guru Pendidikan upaten Bone Bolango. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *5*(1), 85. https://doi.org/10.31004/obsesi.v5i1.527.

Indarta, Y., Jalinus, N., Abdullah, R., & Samala, A. D. (2021). 21st Century Skills : TVET dan Tantangan Abad

21. *Edukatif : Jurnal Ilmu Pendidikan*, *3*(6), 4340–4348. https://doi.org/10.31004/edukatif.v3i6.1458.

Jufriadi, A., Huda, C., Aji, S. D., Pratiwi, H. Y., & Ayu, H. D. (2022). Analisis Keterampilan Abad 21 Melalui Implementasi Kurikulum Merdeka Belajar Kampus Merdeka. *Jurnal Pendidikan Dan Kebudayaan*, *7*(1), 39–53. https://doi.org/10.24832/jpnk.v7i1.2482.

Karmila, W., Achmad, S., & Utami, U. (2023). High-Order Questions Improve Students ' Critical Thinking Skills In Elementary Schools. *International Journal of Elementary Education*, *7*(2), 196–203. https://doi.org/https://doi.org/10.23887/ijee.v7i2.61607.

Kesici, A. (2022). The Effect of Digital Literacy on Creative Thinking Disposition: The Mediating Role of Lifelong Learning Disposition. *Journal of Learning and Teaching in Digital Age*, *7*(2), 260–273. https://doi.org/10.53850/joltida.1063509.

Liu, Z. J., Tretyakova, N., Fedorov, V., & Kharakhordina, M. (2020). Digital Literacy and Digital Didactics As The Basis for New Learning Models Development. *International Journal of Emerging Technologies in Learning*, *15*(14), 4–18. https://doi.org/10.3991/ijet.v15i14.14669.

Makiyah, Y. S., Mahmudah, I. R., Sulistyaningsih, D., & Susanti, E. (2021). Hubungan Keterampilan Komunikasi Abad 21 dan Keterampilan Pemecahan Masalah Mahasiswa Pendidikan Fisika. *Journal of Teaching and Learning Physics*, *6*(1), 1–10. https://doi.org/10.15575/jotalp.v6i1.9412.

Marfiana, R., & Ramadan, Z. H. (2021). ICT-Based Learning Media in the Form of Powerpoint for Grade IV Elementary School Students. *International Journal of Elementary Education*, *5*(2), 350. https://doi.org/10.23887/ijee.v5i3.35494.

Marnita, M., Nurdin, D., & Prihatin, E. (2023). The Effectiveness of Elementary Teacher Digital Literacy Competence on Teacher Learning Management. *Journal of Innovation Ini Educational and Cultural Research*, *4*(1), 45–43. https://doi.org/10.46843/jiecr.v4i1.444.

Monika, T. S., Julia, J., & Nugraha, D. (2022). Peran dan Problematika Guru Mengembangkan 4C Abad 21 di Sekolah Dasar. *Jurnal Cakrawala Pendas*, *8*(3), 884–897. https://doi.org/http://dx.doi.org/10.31949/jcp.v8i2.2672.

Muhali, M. (2019). Pembelajaran Inovatif Abad Ke-21. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *3*(2), 25–50. https://doi.org/10.36312/e-saintika.v3i2.126.

Prayogi, Rayinda Dwi; Estetika, R. (2019). Kecakapan Abad 21: Kompetensi Digital Pendidik Masa Depan. *Jurnal Manajemen Pendidikan: Universitas Muhammadiyah Surakarta*, *14*(2), 144–151. https://doi.org/10.15330/jpnu.5.1.40-46.

Qureshi, M. I., Khan, N., Raza, H., Imran, A., & Ismail, F. (2021). Digital Technologies in Education 4.0. Does it Enhance The Efectiveness of Learning? *International Journal of Interactive Mobile Technologies*, *15*(4), 31–47. https://doi.org/10.3991/IJIM.V15I04.20291.

Rahayu, R., Iskandar, S., & Abidin, Y. (2022). Inovasi pembelajaran abad 21 dan penerapannya di Indonesia. *Jurnal Basicedu*, *6*(2), 2099–2104. https://doi.org/10.31004/basicedu.v6i2.2082.

Redhana, I. W. (2019). Mengembangkan Keterampilan Abad Ke-21 Dalam Pembelajaran Kimia. *Jurnal Inovasi Pendidikan Kimia*, *13*(1). https://journal.unnes.ac.id/nju/index.php/JIPK/article/view/17824.

Restu, H.R. Marwan Indra Saputra, Aris Triyono, S. (2021). *Metode Penelitian*. Budi Utama.

Riyanto, Amin, M., Suwono, H., & Lestari, U. (2020). The new face of digital books in genetic learning: A preliminary development study for students' critical thinking. *International Journal of Emerging Technologies in Learning*, *15*(10), 175–190. https://doi.org/10.3991/ijet.v15i10.14321.

Sailer, M., Murböck, J., & Fischer, F. (2021). Digital Learning in Schools: What Does it Take Beyond Digital Technology? *Teaching and Teacher Education*, *103*. https://doi.org/10.1016/j.tate.2021.103346.

Septikasari, R., & Frasandy, R. N. (2018). Keterampilan 4C Abad 21 Dalam Pembelajaran Pendidikan Dasar. *Jurnal Tarbiyah Al-Awlad*, *8*(2), 112–122. https://doi.org/10.15548/alawlad.v8i2.1597.

Sole, F. B., & Anggraeni, D. M. (2018). Inovasi Pembelajaran Elektronik dan Tantangan Guru Abad 21. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *2*(1), 10. https://doi.org/10.36312/e-saintika.v2i1.79.

Sousa, M. J., Marôco, A. L., Gonçalves, S. P., & Machado, A. de B. (2022). Digital Learning Is an Educational Format towards Sustainable Education. *Sustainability (Switzerland)*, *14*(3), 1–16. https://doi.org/10.3390/su14031140.

Sulasmi, E. (2022). Primary School Teachers' Digital Literacy: An Analysis On Teachers' Skills In Using Technological Devices. *Journal of Innovation in Educational and Cultural Research*, *3*(2), 140–145. https://doi.org/10.46843/jiecr.v3i2.81.

Sulistiani, I. R. (2020). Contextual Teaching and Learning (Ctl) Dan Pengaruhnya Terhadap Hasil Belajar Matematika Mahasiswa. Elementeris. *Jurnal Ilmiah Pendidikan Dasar Islam*, *2*(1), 40. https://doi.org/https://doi.org/10.33474/elementeris.v2i1.6966.

Suryani, N., Setiawan, A., & Putria, A. (2019). *Media pembelajaran inovatif dan pengembangannya*. Remaja Rosdakarya.

Taufiqurrahman, M. (2023). Pembelajaran abad-21 berbasis kompetensi 4c di perguruan tinggi. *PROGRESSA: Journal of Islamic Religious Instruction*, *7*(1), 77–89. https://doi.org/10.32616/pgr.v7.1.441.78-90.

Tersiana, A. (2018). *Metode Penelitian*. CV Budi Utama.

Thaha Abdullateef, S. (2021). Remote Learning: Fostering Learning of 21st Century Skills through Digital Learning Tools. *Arab World English Journal*, *7*(1), 190–201. https://doi.org/10.24093/awej/call7.14.

Tohani, E., & Aulia, I. (2022). Effects of 21st Century Learning on The Development of Critical Thinking, Creativity, Communication, and Collaboration Skills. *Journal of Nonformal Education*, *8*(1), 46–53. https://doi.org/https://doi.org/10.15294/jne.v8i1.33334.

Tohara, A. J. T. (2021). Exploring Digital Literacy Strategies for Students with Special Educational Needs in the Digital Age. *Turkish Journal of Computer and Mathematics Education (TURCOMAT*, *12*(9), 3345–3358. https://doi.org/10.17762/turcomat.v12i9.5741.

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. John Wiley \& Sons.

Tvenge, N., & Martinsen, K. (2018). Integration of Digital Learning in Industry 4.0. *Procedia Manufacturing*, *23*(2017), 261–266. https://doi.org/10.1016/j.promfg.2018.04.027.

Wang, A., & Burdina, G. (2023). Developing Students' Creative Thinking Using Innovative Education Technologies. *Interactive Learning Environments*, *4*(11). https://doi.org/https://doi.org/10.1080/10494820.2023.2184390.

Welerubun, R. C., Wambrauw, H. L., Jeni, J., Wolo, D., & Damopolii, I. (2022). Contextual Teaching and Learning in Learning Environmental Pollution: the Effect on Student Learning Outcomes. *Prima Magistra: Jurnal Ilmiah Kependidikan*, *3*(1), 106–115. https://doi.org/10.37478/jpm.v3i1.1487.

Yani, M., Safrida, S., & Muhibuddin, M. (2021). Application of Contextual Teaching and Learning (CTL) Learning Strategies on Metacognitive Ability and Leaarning Outcomes in Immune System Materials. *Jurnal Penelitian Pendidikan IPA*, *7*(4), 576–581. https://doi.org/10.29303/jppipa.v7i4.765.