Transforming 21st Century Education Through Integration of 6Cs and Digital Technologies in Classroom Learning: A Case Study in Higher Education

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ABSTRACT

This case study investigated the challenges encountered in integrating the 6 Cs of 21st Century Education at FKIP Universitas Islam Balitar, involving 35 students and 4 lecturers. The research utilized observation, questionnaires, and interviews to collect data. The findings revealed several obstacles to the transformation of education, including the students' limited critical thinking, a lack of creativity of students, insufficient collaboration opportunities, inadequate human resources, limited infrastructure, and WiFi availability, and the absence of a comprehensive assessment system related to the implementation of 6 CS in Teaching and learning These challenges highlight the need for targeted interventions to overcome the identified issues. Based on the findings, several implications and recommendations for future researchers are proposed. Firstly, future studies should delve deeper into the specific factors that contribute to the challenges identified in integrating the 6 Cs. This deeper understanding would enable the development of more tailored and effective interventions. Furthermore, assessing the effectiveness of recommended interventions is crucial to evaluate their impact on promoting the 6 Cs and transformative learning. Comparing and adopting best practices from other institutions that have successfully integrated the 6 Cs can provide valuable insights and practical recommendations for FKIP Universitas Islam Balitar to ensure a comprehensive understanding, future research should involve a larger and more diverse sample of students and lecturers. This inclusivity will help capture a broader range of perspectives and contextual factors. Additionally, exploring innovative approaches and strategies can contribute to the advancement of educational transformation efforts at FKIP Universitas Islam Balitar.

Key Words: Transformation, 6 Cs of the 21st Century Education, Digital Technologies, Challenges, Solutions

INTRODUCTION

In the ever-evolving landscape of the 21st century, the field of education has undergone a significant transformation to better equip students with the skills and competencies needed to thrive in a rapidly evolving world (Chiruguru, 2020; Shabrina & Astuti, 2022; Inganah et al., 2023). Traditionally, education focused on rote memorization and knowledge transmission, with a teacher-centered approach dominating the classroom. However, the emergence of technological

advancements, globalization, and changing workforce demands has necessitated a shift towards a student-centered approach (Khanna, 2022). This transformation of education emphasizes critical thinking, problem-solving, and collaboration as essential skills for students. Additionally, the integration of digital technologies has become paramount in fostering personalized learning and developing students' digital literacy skills. Moreover, the creation of inclusive and equitable learning environments has gained recognition, with a focus on promoting diversity and addressing individual needs in 21st-century learning (Khanna, 2022).

Students in the 21st century face a multitude of challenges that demand the development of specific skills and competencies (Sharratt, L. & Planche, 2016). These challenges can be categorized into several key areas such as the rapid advancement of technology offers both opportunities and obstacles for students. While digital tools and resources provide new avenues for learning, collaboration, and creativity, students must navigate information overload, digital distractions, and the need to cultivate digital literacy skills. Besides, globalization and interconnectedness have brought diverse cultures, perspectives, and ideas closer together (Karim et al., 2021).

To effectively engage in this globalized society, students must develop global awareness, cultural competence, and intercultural communication skills, the necessitated understanding and appreciation of different cultural norms, the ability to collaborate with individuals from diverse backgrounds, and adaptability in cross-cultural contexts, through Collaboration the students can learn how to be responsible and take account in achieving common goals (Inganah et al., 2023; Kocabaş, 2022; Shabrina & Astuti, 2022). Therefore, the collaboration of the students can be seen through 1) the ability of the students to work in teteamwork2) The desire of helping each other to achieve the objective planned, and 3) the awareness to be responsible as a member of the team to complete the task shared (Chiruguru, 2020; The Partnership for 21st Century Skills, 2009).

Further, effective communication encompasses the development of students' oral and written communication skills, engage meaningful interactions, and the integration of ICT to support learning and communication processes (Shabrina & Astuti, 2022). In the digital landscape, communication skills are essential for students to express their ideas clearly and effectively convey their messages on various platforms such as Skype, Google Meet, zoom meeting, Whatsapp, Webex, etc. (van Laar et al., 2020). Moreover, mastering effective communication collaboration could impact and outcomes of students working together toward shared goals (Khoiri et al., 2023). Communication skills of the students here can be observed from their ability to 1) express their thought either verbally or non-nonverbal in a certain context clearly, 2) actively engage in attentive listening to accurately interpret and comprehend the intended messages, which may encompass information, beliefs, principles, feelings, and objectives communicated by others, 3) utilize communication for many purposes for examples for giving information, for motivating, for persuading, and for instructing, 4 use various communication platforms/ digital tools and know which one is the best to apply, and 5) conduct communication among various members of society (The Partnership for 21st Century Skills, 2009).

In addition, the modern workforce demands new skills due to rapid changes. Students must be prepared to navigate a dynamic job market, where traditional career paths are no longer linear or predictable. Developing a versatile skill set that includes critical thinking, problem-solving, creativity, adaptability, and effective communication is crucial. In this case, critical thinking is essential for students to navigate the vast amount of information available in the digital world (Fajri & Yusuf, 2021). With the proliferation of information sources and the rise of fake news and misinformation, students need the ability to analyze, evaluate, and discern reliable information. Critical thinking skills empower students to make informed decisions, solve problems creatively, and think independently in the face of complex challenges (Al Marri & Obaid, 2021). In the 21st century of learning, we can evaluate the ability of the students to think critically as well as solve the problems from their ability to 1) Apply different modes of reasoning, such as inductive and deductive logic, as relevant to the specific situation, 2) Analyze how components within complex systems interact to produce overall outcomes, 3) Skillfully assess and appraise evidence, arguments, claims, and beliefs. 4) Analyze and evaluate significant alternative perspectives or viewpoints., 5) Integrate and establish connections between information and arguments 6) Interpret information and derive conclusions based on thorough analysis., 7) Engage in critical reflection on learning experiences and processes, 8) Effectively resolve unfamiliar problems using both conventional and innovative approaches, and 9) Identify and pose meaningful questions that enhance understanding of diverse perspectives and facilitate finding improved solutions (The Partnership for 21st Century Skills, 2009).

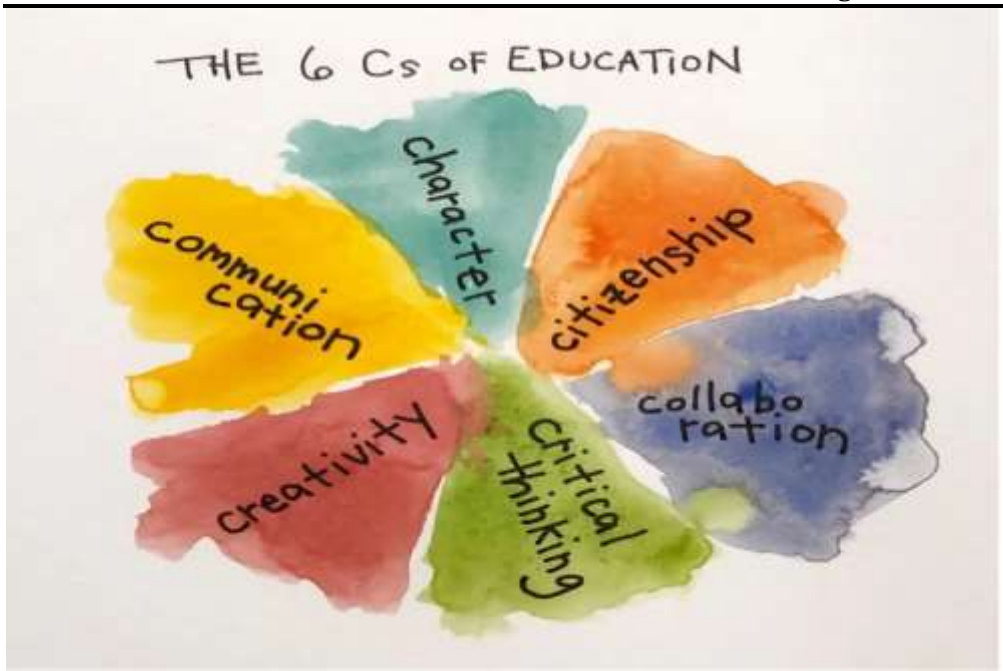
Additionally, in this 21st century, students should be encouraged to embrace an entrepreneurial mindset, fostering innovation and taking initiative. Creativity in this situation is crucial to think innovatively and adapt to rapidly changing circumstances (Sopianingsih & Lukman, 2022). Encouraging creative thinking nurtures students' ability to find unique solutions and adapt to the ever-evolving demands of the digital world (Shabrina & Astuti, 2022). Furthermore, creativity plays a vital role in driving innovation and creating value in various domains (Sopianingsih & Lukman, 2022). Related to creativity we can judge whether the students are creative or not based on their ability to: 1) Employ a variety of methods, such as brainstorming, to generate a broad range of ideas, 2) Generate novel and valuable concepts, encompassing both incremental improvements and radical innovations. 3) Elaborate, refine, analyze, and evaluate personal ideas to enhance and optimize creative endeavors, 4) Develop, implement, and effectively communicate new ideas to others, 5) Embrace and appreciate diverse perspectives, incorporating group input and feedback into collaborative work, 6) Demonstrate originality and ingenuity in tasks while recognizing the practical limitations of adopting new ideas and 7) Regard failures as learning opportunities, understanding that creativity and innovation involve a continuous cycle of small successes and frequent mistakes.

Further, the 21st century is characterized by complex and interconnected problems that require innovative solutions. To tackle these challenges, students need to develop strong problem-solving skills. This includes the ability to analyze complex issues, think critically, consider multiple perspectives, and propose

creative solutions. Embracing challenges as opportunities for growth and learning, students should approach problems with a growth mindset. in today's rapidly changing world, learning extends far beyond formal education. Students must embrace a mindset of lifelong learning to adapt to new technologies, emerging industries, and evolving societal needs. This requires the development of information literacy, self-directed learning skills, and the ability to learn independently. To succeed in learning independently, the students must be able to manage their time and learning objectives well, work to achieve their learning goals independently, and always direct themselves to learning. Related to initiative and directive learning independently e reflected from their ability to; 1) Establish goals with clear criteria for both tangible and intangible achievements, 2) Maintain a balance between short-term tactical goals and long-term strategic objectives, 3 Effectively utilize time and manage workload to optimize productivity and efficiency, 4) possess the ability to monitor, define, prioritize, and complete tasks without constant supervision exhibit the characteristic of being self-directed learners. Moreover, these individuals go beyond simply mastering the fundamental skills or curriculum and actively 1) seek opportunities to expand their knowledge and expertise 2) demonstrate by taking steps to advance their skills towards a professional level, and display a deep commitment to continuous learning throughout their lives, 3) engage in critical reflection on their past experiences, using them as valuable lessons to inform and guide their future progress. By embodying these qualities, individuals foster a proactive and independent approach to learning, enabling them to adapt and excel in various domains.

In this digital era students must have a good character, focuses on ethical values, and have responsible citizenship. In the digital era, promoting ethical values and responsible digital behavior is crucial, as students need to understand the ethical implications of their actions online(van Laar et al., 2020) Character development nurtures integrity, empathy, and responsible citizenship, enabling students to be culturally sensitive and globally aware individuals. Khoiri et al., 2023).

To effectively address the challenges of 21 st century and foster holistic development in the 21st century educators need to integrate the 6 Cs framework into teaching and learning. This framework encompasses communication, collaboration, critical thinking, creativity, character, and citizenship. By incorporating these skills, educators can empower students to navigate the complexities of the digital age (Khoiri et al., 2023; Panggabean et al., 2021). The 6Cs of the 21st Century in Education could be seen in the following figure:



(Taken From https://skooler.com/the-6-cs-of-education/)

Figure 1: 6 Cs of 21st Century in Education

Integrating the 6Cs of the 21st century in classroom learning is a complex process, it requires deliberate planning and intentional instructional practices by teachers. To achieve this, several key strategies must be done by the teachers such as: in Integrating the 6 Cs into the curriculum teachers must ensure their incorporation across various subjects and disciplines. They must create a safe and inclusive learning environment that involves fostering a classroom culture that values diverse perspectives, encourages respectful communication, and promotes active participation of the students. Moreover, teachers should prepare authentic and relevant learning that can be achieved by connecting classroom learning to real-world contexts through project-based learning and community engagement, they must differentiate instruction to recognize students' diverse learning styles, abilities, and interests. Further, teachers must tailor instruction to meet individual needs and integrate digital technologies as tools for enhancing the implementation of the 6 Cs of the 21st century which facilitate collaboration, critical thinking, and creativity. In addition, teachers must do ongoing assessments and give feedback to monitor students' progress and foster metacognitive skills

Related to the Integration of 6Cs and digital technologies, the Faculty of Teacher and Training Education at Universitas Balitar has required the lecturers under its responsibility to integrate C6s and digital technologies in the teaching-learning process, however self-assessment of the students reflected low satisfaction levels with the integration of 6Cs and digital technologies. This suggests a gap between their expectations and the actual implementation. Furthermore, the observations revealed that many students were passive during class discussions, indicating a lack of engagement and active participation., in addition, there was Inadequate Collaboration among the students, for example, the group work presentations

showed a lack of effective collaboration among students, possibly due to insufficient opportunities for collaborative activities or unclear guidelines.

Furthermore, based on the results of interviews with selected participants it was known that some of the lecturers in the institution reported that they did not understand what is 6Cs and the concept of it, in addition, it was reported that the availability and accessibility of digital technology resources in university was lack, it hindered their integration in the teaching-learning process. Some lecturers and students may be resistant to change and hesitant to adopt new teaching and learning approaches, these users did not implement regular evaluation and feedback mechanisms to monitor the progress of the integration and make necessary adjustments based on students' needs. Previous research in the field of 21st-century skills has dominantly focused on the implementation of the 4Cs (critical thinking, communication, collaboration, and creativity) in the classroom (Pardede, 2020; Radifan, 2020; Azhary, 2021). While some studies have explored the elements required for the 4Cs and analyzed the digital skills of pre-service teachers (Khoiri et al., 2023), and assessed the levels of 6Cs among trainee teachers (Karim et al., 2021), however, there is a gap in understanding how educators can seamlessly integrate the 6Cs framework into their teaching practices. Therefore, the researchers were interested to highlight the challenges faced in integrating the 6Cs and digital technologies in the teaching-learning process at FKIP Universitas Balitar. The preliminary findings emphasized the need for a comprehensive framework for training, resource provision, and pedagogical strategies to enhance students' skills related to 6C and digital technologies in learning. By addressing these challenges and implementing the proposed recommendations, FKIP Universitas Balitar can improve the integration of 6Cs and digital technologies, ultimately enhancing the teaching-learning experience and student outcomes.

METHOD

This part presents a detailed account of the research methodology employed in the study. It outlines the research design, participant selection, data collection procedures, and data analysis techniques. This chapter aimed to provide a clear understanding of how the study was conducted and to ensure the reliability and validity of the research findings. The design of this research is a case study. A case study is a research design that involves an in-depth investigation and analysis of a specific situation, organization, or individual. It aims to provide a comprehensive understanding of a particular phenomenon, problem, or event by examining multiple aspects and collecting various types of data (Yin, 2016). The research adopted a single case study design to investigate the integration of the 6Cs (communication, collaboration, critical thinking, creativity, character, and citizenship) and digital technologies in the teaching-learning process at FKIP Universitas Balitar. This design was chosen due to its suitability for conducting an in-depth examination of a specific context and gaining rich insights into the phenomenon under investigation. The single case design allowed for a comprehensive exploration of the challenges and opportunities associated with integrating the 6Cs and digital technologies in a specific educational institution.

The participants in this study consisted of 4 lecturers and students from the Faculty of Teacher and Training Education at Universitas Balitar. Purposive sampling was employed to select lecturers who were responsible for integrating the 6Cs and digital technologies in their teaching (Creswell, 2012). In this case, the requirement of participants is the lecturer must possess a diverse range of experiences and expertise in implementing the 6Cs in their classroom learning and also be a permanent lecturer of the institution, actively conducting "Tri Darma PT". A diverse group of students from different programs and levels was included to ensure a comprehensive representation of the student population with the total 35 students.

Data from this study were collected through multiple methods to ensure the triangulation of findings and enhance the validity of the study. The primary data collection methods included: A survey questionnaire was administered to the students to assess their mastery levels with the integration of the 6Cs and digital technologies. The survey items were designed to measure various aspects of the integration of 6 Cs and Digital technologies in teaching learning at FKIP Universitas Islam Balitar. The survey responses were collected anonymously to ensure confidentiality. Furthermore, there were 1-5 options for scores to reflect the students' mastery. In this case, 1 means the students are having minimal or no mastery of the skill or concept, and 2 means students arere having: Limited proficiency with room for improvement.3: means the students are having Moderate proficiency, demonstrating a basic understanding, 4 means the students are having good proficiency, indicating a solid grasp of the skill or concept. And 5 means that students are having very good mastery, showcasing an advanced level of proficiency and application. The students were asked to assign a score to each category based on their perceived abilities in integrating the 6 Cs of 21st-century learning and digital technologies. The categories assessed were as follows: Collaboration (C), Communication (Co) Critical Thinking (CT) Creativity (Cr) Citizenship/ Culture (Ci,) and Character (Ch). Self-assessment provided an opportunity for students to reflect on their abilities and gauge their perceived proficiency in each category. The scores obtained from the self-assessment can be analyzed to identify areas where students feel they have strengths and areas that require further improvement. This information can be valuable for educators to tailor instructional strategies and interventions to enhance students' development in the 6 Cs and digital technologies, addressing specific areas where students may feel less confident or competent. The data from the questionnaire was reported in the form of percentages by applying these categories; Good = 76%-100%, Moderate = 56% -75%, Less Good = 40%-55%, and Bad= less than 40%

The next data were gained from Classroom Observations: Classroom observations were conducted to observe the students' level of engagement, active participation, and collaboration during class discussions and group work activities. These observations provided valuable insights into the actual implementation of the 6Cs and digital technologies in the teaching-learning process. Mainly the indicators use to be observed were not far from the

questionnaire indicators. The result of classroom observation would be described qualitatively.

In addition, the last data were gained from Interviews. In this research Semi-structured interviews were conducted with selected participants, including lecturers, to gather in-depth insights into their understanding of the 6Cs, their experiences in integrating them with digital technologies, and the challenges they encountered. (Creswell & Creswell, 2018), The interviews provided a platform for participants to share their perspectives and experiences, enriching the understanding of the research phenomenon. The collected data were analyzed using a thematic analysis approach. The survey responses, observation notes, and interview transcripts were transcribed, coded, and categorized into recurring themes and patterns. The identified themes were then interpreted and discussed as research objectives and existing literature. Moreover, ethical considerations were of paramount importance throughout the research process. Informed consent was obtained from all participants, and their confidentiality and anonymity were ensured. The research adhered to ethical guidelines and principles, including voluntary participation, the right to withdraw, and the secure storage of data.

RESULT AND DISCUSSION

RESULTS

The result of Students' Self Assessment Related to the Integration of 6 Cs and Digital Technology in Learning

In this section, the researchers present the results of the student's self-assessment meant related to the integration of the 6 Cs of 21st-century learning and digital technologies.

Table 1: The Result of Students' Self Assessment Related to the Integration of 6 Cs of 21st-century Learning and Digital Technologies

6 Cs	No	**Self Assessment Questions**	N	**%**	**Criteria**
Communication	1	I can express my thought either verbally or nonverbal in certain contexts clearly	149	85.14	Good
	2	I can actively engage in attentive listening to accurately interpret and comprehend the intended messages, which may encompass information, beliefs, principles, feelings, and objectives communicated by others	135	77.14	Good
	3	I can conduct communication for many purposes for example for giving information, motivating, persuading, and instructing	147	84.00	Good

	4	I can use various communication platforms/ digital tools and know which one is the best to apply	138	78.86	Good
	5	I can conduct communication among various members of society	146	83.43	Good
		Mean Score	715	81.71	Good
Collaboration	6	I can work in a teamwork	123	70.29	Moderate
	7	I have the desire of helping each other to achieve the objective planned	125	71.43	Moderate
	8	I am responsible as a member of the team to complete the task shared	124	70.86	Moderate
		Mean Score	124.00	70.86	Moderate
Critical Thinking	9	I can Apply different modes of reasoning, such as inductive and deductive logic, as relevant to the specific situation,	100	57.14	Moderate
	10	I can Analyze how components within complex systems interact to produce overall outcomes,	98	56.00	Moderate
	11	I Skillfully assess and appraise evidence, arguments, claims, and beliefs	96	54.86	Less Good
	12	I can analyze and evaluate significant alternative perspectives or viewpoints.,	96	54.86	Less Good
	13	I can Integrate and establish connections between information and arguments	97	55.43	Less Good
	14	I can Interpret information and derive conclusions based on thorough analysis	88	50.29	less Good
	15	I can Engage in critical reflection on learning experiences and processes	98	56.00	Moderate
	16	I can solve unfamiliar problems using both conventional and innovative approaches,	97	55.43	Less Good
		Mean Score	96.25	55.00	Less Good
Creativity	17	I can employ a variety of methods, such as brainstorming, to generate a broad range of ideas	88	50.29	Less Good
	18	I can generate novel and valuable concepts, encompassing both incremental improvements and radical innovations	95	54.29	Less Good

	19	I can elaborate, refine, analyze, and evaluate personal ideas to enhance and optimize creative endeavors	90	51.43	Less Good
	20	I can develop, implement, and effectively communicate new ideas to others,	99	56.57	Moderate
	21	I can embrace and appreciate diverse perspectives, incorporating group input and feedback into collaborative work tasks while recognizing the practical limitations of adopting new ideas	108	61.71	Moderate
	22	I can demonstrate originality and ingenuity in tasks while recognizing the practical limitations of adopting new ideas	97	55.43	Less Good
	23	I can regard failures as learning opportunities, understanding that creativity and innovation involve a continuous cycle of small successes and frequent mistakes	91	52.00	Less Good
		Mean Score	95.43	54.53	Less Good
Culture/ Citizenship	24	I can understand local and global cultures	143	81.71	Good
	25	I can respect cultural diversity and inclusivity	145	82.86	Good
	26	I participate in Community services and am responsible for social issues in the society	143	81.71	Good
	27	I am actively active in campus activity	140	80.00	Good
	28	I am aware of social, environmental, and global issues	189	108.00	Good
	29	I am responsible for my academic responsibilities and social responsibilities	152	86.86	Good
	30	I can understand the various cultures, traditions, and customs in society	142	81.14	Good
	31	I can communicate and collaborate effectively with people from diverse backgrounds	152	86.86	Very Good
	32	I have sensitivity and empathy towards individuals with different cultural identities	147	84.00	Good
	33	I have a strong willingness to challenge stereotypes and biases.	150	85.71	Good
		Mean Score	136.64	78.08	Good

Character	34	I am loyal to my organization	146	83.43	Good
	35	I am honest in my action	110	62.86	Moderate
	36	I decide something in an ethical manner	137	78.29	Good
	37	I am responsible for my actions and their impact on others	141	80.57	Good
	38	I never give up easily to obtain my goal	144	82.29	Good
	39	I show empathy, compassion, and respect towards others.	142	81.14	Good
		Mean Score	136.67	78.10	Good

(Adapted from The Partnership for 21st Century Skills, 2009)
Percentages categories: good = 76%-100%, moderate= 56%-75%, Less Good = 40%-55%, and Bad = less than 40%

Based on the self-assessment results related to the integration of the 6 Cs of 21st-century learning and digital technologies, here is a descriptive explanation of the findings from the table we communication variable revealed that the majority of students (85.14%) feel they can express their thoughts clearly in various contexts. A significant percentage (77.14%) actively engages in attentive listening to interpret and comprehend messages from others. Most students (84.00%) can conduct communication for multiple purposes, such as giving information, motivating, persuading, and instructing. Many students (78.86%) have the knowledge to use different communication platforms and digital tools effectively. Overall, the mean score for communication is 81.71%, indicating a good level of proficiency.

Moreover, in Collaboration, Students' self-assessment shows that they have moderate abilities in working as a team (70.29%). They express a moderate level of desire to help each other achieve planned objectives (71.43%). Students generally feel responsible for completing shared tasks as team members (70.86%). The mean score for collaboration is 70.86%, indicating a moderate level of proficiency.

Students' critical thinking self-assessment reveals that students have varying levels of proficiency in different aspects of critical thinking. They show moderate abilities in applying different modes of reasoning (57.14%) and analyzing interactions within complex systems (56.00%). Skillful assessment and appraisal of evidence, arguments, claims, and beliefs are considered less good (54.86%). Analyzing and evaluating alternative perspectives or viewpoints also falls into the less good category (54.86%). The mean score for critical thinking is 55.00%, indicating a less good level of proficiency.

Then creativity of the students' self-assessment indicates a less good level of proficiency in creativity. They show less-good abilities in employing a variety of methods to generate ideas (50.29%) and generating novel and valuable concepts (54.29%). elaborating, refining, analyzing, and evaluating personal ideas to

enhance creative endeavors is also considered less good (51.43%). However, students demonstrate a moderate level of proficiency in developing, implementing, and effectively communicating new ideas (56.57%). The mean score for creativity is 54.53%, indicating a less good level of proficiency.

In addition, culture/citizenship of the students generally has a good understanding of local and global cultures (81.71%). They showed respect for cultural diversity and inclusivity (82.86%). Active participation in community services and responsibility towards social issues is observed (81.71%). Students were actively engaged in campus activities (80.00%). They also displayed awareness of social, environmental, and global issues (108.00%). The mean score for culture/citizenship is 78.08%, indicating a good level of proficiency.

The last indicator is character. In this point, the students demonstrate good qualities in terms of loyalty to their organization (83.43%), ethical decision-making (78.29%), and personal responsibility towards others (80.57%). They also show determination in pursuing their goals (82.29%) and empathy, compassion, and respect toward others (81.14%). However, honesty in actions is considered moderate (62.86%). The mean score for the character is 78.10%, indicating a good level of proficiency. Overall, the student's self-assessment suggests good proficiency in communication, culture/citizenship, and character. However, there are areas of improvement needed in collaboration, critical thinking, and creativity. These findings provide insights into the students' self-perceived abilities in integrating the 6 Cs of 21st-century learning and digital technology

The result of Classroom Observation Note of Teaching Learning Process

During the class observation, the researchers noted several significant issues related to the teaching and learning process that focused on integrating the 6 Cs and digital technologies in education. The following is a summary of the observed deficiencies and challenges: Students displayed a lack of critical thinking skills, relying more on surface-level understanding and memorization rather than engaging in deep analysis and evaluation of information. They struggled to apply different modes of reasoning, such as inductive and deductive logic, relevant to specific situations. Analyzing how components within complex systems interact was challenging for them. assessing evidence, arguments, claims, and beliefs proved difficult for the students. Integrating information and arguments, interpreting information, engaging in critical reflection, and solving unfamiliar problems were areas where students showed limited proficiency

During a class discussion on a current issue, students primarily provided superficial responses without thoroughly examining the underlying causes or potential solutions. They struggled to analyze the complexities of the problem and could not critically evaluate different perspectives or propose innovative approaches. Furthermore, students demonstrated a lack of creativity in their approach to problem-solving and generating original ideas. They relied on conventional and previously explored solutions, showing little diversity or fresh perspectives. Students exhibited resistance to taking risks and were hesitant to explore unconventional methods of problem-solving

Regarding elaboration, refinement, and enhancement of ideas were minimal, indicating a lack of effort in developing their concepts. During a group project focused on developing sustainable solutions for energy conservation, students primarily suggested widely known methods such as reducing energy consumption or using renewable energy sources. They failed to offer unique or imaginative ideas that could challenge existing norms and push the boundaries of creativity. Further, Limited collaborative efforts were observed, with students displaying a reluctance to actively participate and contribute ideas within a team setting. Individualistic tendencies hindered effective teamwork and cooperation among students.

During group activities, only a few students actively engaged in discussions and shared ideas, while others remained passive observers. The lack of effective collaboration resulted in missed opportunities for peer learning and synergistic problem-solving. In addition, analyzing how components within complex systems interact also become a challenge for them, they struggle to effectively assess and appraise evidence, arguments, claims, and beliefs. interpreting information and deriving conclusions based on thorough analysis, demonstrated a limited capacity for engaging in critical reflection on learning experiences and processes. They need guidance and opportunities to foster a deeper level of self-reflection. The students found it challenging to solve unfamiliar problems using both conventional and innovative approaches. They need to develop stronger problem-solving strategies and the ability to think creatively.

In addition, during the class observation, the students were engaged in a group project where they were required to come up with innovative solutions to real-world problems. Despite the open-ended nature of the assignment, the students demonstrated a clear lack of creativity in their approach.
Throughout the observation, it was evident that the students struggled to generate original ideas. Their proposals largely mirrored conventional solutions that have been previously explored. For example, when brainstorming ideas for environmental conservation, most groups suggested recycling initiatives and tree-planting campaigns without offering any fresh perspectives or alternative strategies.
Furthermore, the range of ideas put forward by the students was limited. Many groups seemed to rely on a handful of repetitive ideas, resulting in a lack of diversity in their proposals. This suggested a narrow perspective and an absence of imaginative thinking among the students. Another noticeable aspect was the students' resistance to taking risks. They appeared hesitant to deviate from established approaches or explore unconventional methods of problem-solving. Rather than embracing the opportunity to think outside the box, they preferred to stick to familiar and safe solutions, which hindered their ability to demonstrate creativity. Moreover, the students exhibited minimal elaboration or refinement of their ideas. They seemed content with surface-level analysis and failed to delve deeper into their concepts. This lack of effort in developing their ideas indicated a disregard for the potential of creative exploration and enhancement.

The observed lack of creativity among the students could be attributed to several factors. The educational environment appeared to focus more on conformity and adherence to established norms, leaving little room for encouraging divergent

thinking. Additionally, the absence of explicit instruction and guidance on nurturing creativity might have contributed to the students' struggle in generating innovative ideas. The impact of this lack of creativity on the students' learning experiences is significant.

The Result of Interview with Selected Participants Regarding the Integration of 6Cs and Digital Technologies in Teaching Learning

Interview with the selected participants regarding the Integration of 6Cs and Digital Technologies in Teaching and Learning was conducted with 4 lecturers who fulfilled the requirements as the participant. Their responses aligned with the findings of the research, emphasizing the challenges encountered in the integration of the 6Cs (Critical thinking, Creativity, Collaboration, Communication, Character, and Citizenship) and digital technologies in teaching and learning.
The first participants highlighted the following key issues: Lack of Critical Thinking: The lecturers expressed concerns about the students' limited critical thinking skills. They noted that students often struggle to analyze information critically, make connections between different concepts, and evaluate the validity of arguments and evidence.

P01: "I have noticed that many students face difficulties in critically analyzing information. They often struggle to identify logical fallacies and fail to make connections between different perspectives." ." (Int-P01/TLP/CT01/OFF)

P01: "To address the lack of critical thinking, I incorporate digital tools such as online discussion platforms and interactive quizzes that require students to analyze and evaluate information. However, I still notice a gap in their ability to think critically, and I am exploring additional strategies to strengthen this skill." (Int-P01/TLP/CT02/OFF)

Furthermore, the lecturer emphasized that students tend to lack creativity in their approach to learning. They mentioned that students often rely on rote memorization and struggle to think outside the box or generate innovative ideas.

P02: "I have observed that students are hesitant to think creatively and come up with unique solutions. They prefer sticking to conventional methods rather than exploring new possibilities." (Int-P02/TLP/CR01/OFF)

P02 "In my teaching, I utilize digital technologies like multimedia presentations, video creation tools, and virtual reality simulations to encourage creative thinking. However, I find that many students still struggle to embrace their creative potential and think beyond the conventional methods." (Int-P02/TLP/CR02/OFF)

In addition, the lecturer pointed out the limited collaboration among students, which hinders their ability to work effectively in teams and engage in collective problem-solving

P03 "Collaboration is a crucial skill for the 21st century, but many students struggle to collaborate effectively. They find it challenging to communicate and cooperate with their peers, hindering their progress in group activities." (Int-P03/TLP/CL01/OFF)
P03: "To foster collaboration, I incorporate digital collaboration tools such as shared online documents, discussion forums, and virtual group projects. However, I notice that some students find it challenging to engage actively in collaborative activities and prefer individual work." (Int-P03/TLP/CL02/OFF)

Besides, the fourth participant highlighted the shortage of qualified teachers or facilitators who possess the necessary expertise in integrating the 6Cs and digital technologies effectively.

P04: "We face challenges in finding enough skilled teachers who can guide students in developing the 6Cs. The lack of human resources with expertise in this area affects the overall implementation and support for students learning." (Int-P04/TLP/HR01/OFF

P04: "While reflecting on the interview questions and discussing the 6Cs, I realized that I need to deepen my understanding of these competencies. I recognize that there is more to learn and explore to effectively integrate the 6Cs into my teaching practices." (Int-P04/TLP/HR02/OFF)

Further, the first participant expressed concerns about the inadequate availability of infrastructures and reliable WiFi connections, limiting students' access to digital technologies and hindering their engagement in technology-enhanced learning.

P01: "Insufficient infrastructures and unreliable WiFi connections pose significant challenges for students. It restricts their access to digital tools and resources, impeding their exploration and utilization of digital technologies for learning."

(Int-P01/TLP/INF01/OFF)

"To overcome the infrastructural challenges, we are trying to use the hotspot from our smartphone, I hope the institution cares about this and tries to add the internet bandwidth for the implementation and the integration of 6Cs and digital technologies can run smoothly and impact students' learning outcome positively." (Int-P01/TLP/INF02/OFF)

In addition, the lecturers highlighted the absence of a comprehensive assessment system that effectively evaluates students' mastery of the 6Cs and their integration with digital technologies.

P03: "We lack a comprehensive assessment framework to measure students' progress in the 6Cs. It is crucial to have an evaluation system that adequately reflects their critical thinking, creativity, collaboration, and other competencies developed through digital technology integration." (Int-P03/TLP/ASS01/OFF)

P03: "Recognizing the need for a comprehensive assessment, I am in the process of designing rubrics and performance tasks that assess students' progress in the 6Cs. This helps me evaluate their critical thinking, creativity, collaboration, and other competencies developed through the integration of digital technologies." (Int-P03/TLP/ASS02/OFF)

Overall, the sample of interview results with the selected participants supports the research findings, emphasizing the challenges related to students' lack of critical thinking, creativity, collaboration, limited human resources, inadequate infrastructures, and WiFi, and the absence of a comprehensive assessment system. These insights shed light on the existing gaps that need to be addressed to foster the successful integration of the 6Cs and digital technologies in teaching and learning.

DISCUSSION

From the results of the questionnaire, observation class, and interview we may summarize that the Challenges of Integration of 6 Cs and Digital Technologies in FKIP Universitas Islam Balitar mainly covered: 1) students' lack of critical thinking, 2) lack of creativity, 3) lack of collaboration, 4) lack of human resources, 5) lack of infrastructures and wifi, and 6)lack of a comprehensive assessment

Firstly, regarding critical thinking, students demonstrated a tendency to rely on surface-level understanding and memorization instead of engaging in deep analysis and evaluation. They struggled with applying different modes of reasoning, analyzing complex systems, assessing evidence and arguments, and interpreting information. They also faced difficulties in engaging in critical reflection and solving unfamiliar problems. This result is in line with Karim et al., (2021) who argued individuals struggle to make connections and explore diverse perspectives from various sources and they face difficulties in identifying patterns that are crucial for constructing a deep level of understanding. This can be attributed to their limitations in reasoning, interpretation, and analytical skills, which impede their ability to integrate knowledge across different boundaries and disciplines. However, it is worth noting that item C6 stands out as the simplest item, suggesting that trainee teachers excel in providing justifications based on intuition and exhibit a strong capacity for evaluating the validity of information and arguments. We may Integrate critical thinking skills explicitly into the curriculum and provide clear learning objectives. Offer specific instruction and guidance on critical thinking strategies and techniques. Incorporate real-world problem-solving scenarios and case studies into lessons. implement assessment methods that prioritize critical analysis and higher-order thinking skills.

Furthermore, these research results are also in the same vein as Al Marri & Obaid, (2021) who highlighted the essential personal aspects of a critical thinker, which encompass a solid grasp of logical principles and the capacity for interpretation. Based on these insights, the study puts forward a set of recommendations aimed at promoting critical thinking. These recommendations

emphasize the significance of integrating critical thinking into educational institutions at both the school and university levels. Additionally, the study underscores the importance of providing training courses for teachers and learners, equipping them with the necessary skills to effectively employ critical thinking in the educational process. By implementing these suggestions, institutions can foster an environment that nurtures and cultivates critical thinking skills among students, thereby enhancing their ability to analyze, reason, and interpret information.

Secondly, in terms of creativity, students could not think innovatively and generate original ideas. They predominantly relied on conventional solutions and showed limited diversity and fresh perspectives. They exhibited resistance to taking risks and exploring unconventional problem-solving approaches. Moreover, they put minimal effort into elaborating and refining their ideas. Collaboration among students was also a challenge, as there was a noticeable reluctance to actively participate and contribute ideas in group settings. Lack of creativity might be caused by Limited opportunities for creative expression and exploration, a Restrictive educational environment that emphasizes conformity, lack of exposure to diverse perspectives and alternative approaches. Insufficient encouragement to take risks and think innovatively.

Creativity plays a vital role in fostering critical thinking, problem-solving, and adaptability—skills essential for success in the 21st century.(Kim & Seidman, 2019) Without opportunities to explore and express their creativity, students may struggle to develop a holistic understanding of complex issues and may be limited in their ability to develop innovative solutions. To address this issue, it is recommended to incorporate more open-ended assignments that encourage students to think creatively and explore alternative solutions. Teachers can guide divergent thinking techniques and create a supportive classroom environment that values and rewards creative efforts. Collaborative projects and exposure to diverse perspectives can also help broaden students' thinking and encourage creative collaboration.

Moreover, Pardede, (2020) highlighted some strategies to foster creativity among students by encouraging them to delve deeper into newly introduced lessons. Prompt them to define key terms, providing not only their basic meanings but also exploring their denotations, synonyms, and antonyms, and offering examples to illustrate their usage, Stimulate idea generation through mind-mapping exercises. Assign students to create visual representations of their thoughts, allowing them to connect concepts, brainstorm ideas, and explore various associations and relationships. Enhance understanding by assigning students to create diagrams or sketches that depict and model abstract or complex concepts. This visual representation helps students grasp the intricacies of the concept and aids in their overall comprehension, Promote ICT (Information and Communication Technology) skills development by assigning students to engage in online writing. Utilizing platforms like blogs, students can freely write, edit, and publish their work, while also having the opportunity to comment on their peers' blog posts. This activity not only fosters creativity but also nurtures critical thinking, communication, and collaboration skills. Incorporate additional activities such as sharing speeches, engaging in circles of

life discussions, and creating fictional stories. These diverse activities provide students with opportunities to express their creativity, engage in meaningful discussions, and tap into their imaginative capacities, further enriching their learning experience.

In addition, students' Lack of Collaboration might be hindered by designing collaborative projects and activities that require students to work together towards a common goal, teaching effective communication and cooperation skills, including active listening and respectful dialogue. Besides, Foster a culture of collaboration and teamwork through team-building exercises and cooperative learning strategies. Provide guidance on conflict resolution and problem-solving within collaborative settings, Review and revise the curriculum to explicitly incorporate the 6 Cs of 21st-century learning, emphasizing critical thinking and collaboration skills, and integrate technology-related content and activities across disciplines to enhance digital literacy and technological integration. Individualistic tendencies hindered effective teamwork and cooperation, resulting in missed opportunities for collaborative learning and problem-solving. Pardede, (2020) suggested teachers facilitate collaborative learning by assigning students to work together on various tasks such as matching, listing, ranking, sorting, and information gap activities. These group activities promote shared problem-solving and encourage students to engage with different perspectives, fostering critical thinking skills. Moreover, Pardede, (2020) also suggested encouraging active learning and incorporating interactive storytelling activities to enhance collaboration and integrated skills while maintaining an enjoyable learning atmosphere. Examples of such activities include Zoom, story grab bag and co-constructed stories. These activities encourage students to actively participate in creating, sharing, analyzing, modifying, and role-playing stories, allowing for critical thinking and fostering creativity. Besides Foster peer review and feedback by having students evaluate each other's assignments. Dividing into small groups, students provide constructive feedback on their peers' work. This activity can be facilitated both in traditional classroom settings and online platforms. By uploading their papers to a group platform in the learning management system (LMS), students receive valuable feedback from their peers, promoting critical thinking and enhancing their understanding of the subject matter (Pardede, 2020).

In addition, not all of the lecturers at FKIP Universitas Islam Balitar understood the concept of 6 Cs, this matter may be influenced by some factors such as Inadequate training and professional development opportunities for educators. Limited knowledge and awareness of the 6 Cs framework and its significance. Resistance to change or reluctance to incorporate new teaching approaches. Having 6Cs competency becomes a requirement among novice teachers to become competent teachers (Karim et al., 2021). teachers are considered competent and professional when they have a vast knowledge of various fields. The 6Cs elements produce a teacher who can stimulate conducive learning as well as improve the relationship between teachers and students as well as increase professionalism in competing in the changing world of education. Therefore, the institution should establish mentoring programs or peer support networks where experienced educators can guide and support their colleagues. In addition, institutions must allocate resources and dedicated time for educators to explore

and implement the 6 Cs effectively in their teaching practices., and provide faculty members with training and professional development opportunities focused on integrating the 6 Cs into their teaching practices. Offer workshops and seminars on effective strategies for promoting critical thinking and fostering collaboration among students. Provide ongoing support and resources to faculty members to enhance their digital technology skills and integrate technology effectively into their teaching.

Further, the integration of 6Cs and digital technologies requires constant support (Margaryan & Kalugina, 2020). Regarding the problem of limited WiFi, there are many solutions to release that problem such as: Advocating for improved infrastructure and network coverage within educational institutions Seeking partnerships with internet service providers, or government initiatives to enhance WiFi availability and reliability. Exploring alternative connectivity options, such as mobile data plans or offline access to digital resources. Develop contingency plans for situations when WiFi access is limited, including offline activities or resource materials. By implementing these solutions, educational institutions can address the challenges related to the integration of the 6 Cs and digital technologies, ultimately fostering a more holistic and future-ready learning environment for students. Educational institutions must address the limitations of WiFi facilities. This can be achieved by investing in infrastructure upgrades, increasing bandwidth capacity, or exploring alternative solutions such as mobile data hotspots. By ensuring reliable and accessible internet connectivity, institutions can provide students with the necessary tools to develop the 6Cs and facilitate a more effective teaching and learning environment

Moreover, developing comprehensive assessments that measure and provide feedback on students' critical thinking, creativity, and collaboration skills is required. Incorporate rubrics and criteria that explicitly assess the 6 Cs of 21st-century learning in assignments and projects. Provide timely and constructive feedback to students to guide their development in critical thinking and collaboration because by giving feedback gradually, teachers enhance their professionalism (Kim & Seidman, 2019). The challenges and solutions of the integration of 6 Cs and digital technologies above could be summarized in the following table :

Table 2. Challenges and Solutions of the Integration of 6Cs and Digital Technologies in FKIP Universitas Islam Balitar

No	Challenges	Solutions Proposed
1.	Students' Lack of Critical Thinking	Integrate critical thinking skills into the curriculum Provide instruction and guidance on critical thinking Incorporate real-world problem-solving scenarios Implement assessment methods focusing on critical analysis
2	Students' Lack of Creativity	Create opportunities for creative expression and exploration Foster an inclusive and supportive environment for divergent thinking Incorporate diverse perspectives and alternative approaches

		Utilize creativity-enhancing techniques.
3	Students' Lack of Collaboration	Design structured collaborative projects and activities Teach effective communication and cooperation skills Foster a culture of collaboration and teamwork Guide conflict resolution and problem-solving.
4	Limited Understanding of the 6 Cs of the 21st century by faculty members	Provide comprehensive training and professional development Encourage continuous learning and staying updated on the 6 Cs. Of 21st Century of Education Establish mentoring programs or peer support networks. Allocate resources and time for implementation.
5	Limited Access to Reliable WiFi	Advocate for improved infrastructure and network coverage Seek partnerships with internet service providers or government initiatives Explore alternative connectivity options. Develop contingency plans for limited WiFi access.
6	Lack of Assessment	Develop a comprehensive assessment framework that aligns with the 6 Cs and digital technologies integration Clearly define learning objectives and outcomes related to the 6 Design varied assessment methods, including formative and summative assessments Incorporate authentic and performance-based assessments that require the application of the 6 Cs in real-world contexts Develop rubrics and criteria to evaluate students' proficiency in each of the 6 Cs based on the Vision and Mission of the institution Regularly review and revise the assessment framework based on feedback and data analysis.

By implementing the solutions provided, FKIP Universitas Islam Balitar can effectively address the lack of critical thinking and collaboration skills among students lack of creativity, 3) lack of collaboration, lack of human resources lack of infrastructure and wifi, and 6) lack of a comprehensive assessment. The integration of the 6 Cs and digital technologies will enhance the educational experience, preparing students to be competent educators who can navigate complex challenges and contribute positively to society.

CONCLUSION

In conclusion, the application of the 6Cs framework along with digital technologies for educational transformation at FKIP Universitas Islam Balitar has faced several challenges. These challenges include students' limited critical thinking abilities, a lack of creativity, insufficient collaboration opportunities, inadequate human resources, limited infrastructures and WiFi availability, and the absence of a comprehensive assessment system. However, by identifying these problems early on, it becomes possible to formulate effective solutions. Addressing these challenges through targeted interventions such as curriculum

enhancements, faculty development programs, investment in infrastructure, and the implementation of robust assessment strategies can pave the way for the successful integration of the 6Cs and digital technologies, ultimately fostering a transformative learning environment at FKIP Universitas Islam Balitar.

REFERENCES

Al-Marri, S. S., & Obaid, H. H. (2021). The Impact of the Critical Thinking on Cognitive Building. *Islamic Scientific Journal*, *12*(8), 391–410.

Chiruguru, S. B. (2020). The Essential Skills of 21st Century Classroom – President Barak Obama Research. *Shingania University*, *10*(1). https://doi.org/10.13140/RG.2.2.36190.59201

Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (Fourth, p. 634). Pearson Education Inc.

Creswell, J. W., & Creswell, D. J. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Fifth). SAGE Publication Inc.

Fajri, I., & Yusuf, R. (2021). Application of Project Citizen Learning Model : Descriptive Analysis of 21St Century Skills of High. *Jurnal Pendidikan Kewarganegaraan Undiksha*, *9*(3), 1–12.

Inganah, S., Darmayanti, R., & Rizki, N. (2023). Problems, Solutions, and Expectations : 6C Integration of 21st Century Education into Learning Mathematics. *JEMS (Journal of Mathematics and Science Education*, *11*(1), 220–238.

Karim, E., Azah, N. ', Safran, A., Shuib, H., & Azmi, A. (2021). Level of 6Cs Global Competencies among Trainee Teachers upon the Implementation of Pedagogical Capacity for Deep Learning based on Rasch Measurement. *International Research Journal of Education and Sciences (IRJES)*, *5*(November).

Khanna, R. (2022). Switch from traditional to modern teaching. *Hans India*, 4–7.

Khoiri, A., Adi, N. P., Najib, M., Adib, A., Trisnowati, E., Ariyani, M., & Info, A. (2023). 21st Century DigitaL Skills: Communication, Collaboration, Creativity, Critical Thinking in Pre-Service Physics Teachers. *SPEKTRA: Jurnal Pendidikan Dan Kajian Sains, 9*(1), 112–123.

Kim, S., & Seidman, E. (2019). *Improving 21st-century teaching skills : The key to effective 21st-century learners*. https://doi.org/10.1177/1745499919829214

Margaryan, T. D., & Kalugina, L. V. (2020). Digital Transformation of English Language Teaching (ELT) at a Technical University: BMSTU Case Study. *ITM Web of Conferences*, *35*, 01009. https://doi.org/10.1051/itmconf/20203501009

Panggabean, F. T. M., Pardede, P. O., Sitorus, R. M. D. S., Situmorang, Y. K., Naibaho, E. S., & Simanjuntak, J. S. (2021). Application of 21st Century Learning Skills Oriented Digital-Age Literacy to Improve Student Literacy HOTS in Science Learning in Class IX SMP. *Jurnal Mantik*, *5*(3), 1922–1930. https://iocscience.org/ejournal/index.php/mantik/article/view/1796

Pardede, P. (2020). Integrating the 4Cs into EFL Integrated Skills Learning. *JET Jurnal of English Teaching*, *6*(February), 71–85.

Shabrina, A., & Astuti, U. P. (2022). The Integration of 6Cs of the 21st Century Education into English Skills: Teachers' Challenges and Solutions. *Jurnal*

Pendidikan: Teori, Penelitian, Dan Pengembangan, *7*(1), 28. https://doi.org/10.17977/jptpp.v7i1.15185

Sharratt, L. & Planche, B. (2016). Leading Collaborative Learning : Empowering Excellence. Thousand Oaks. *Canadian Journal of Educational Administration and Policy*, 2–4.

The Partnership for 21st Century Skills. (2009). *P21 Framework Definitions*. http://www.21stcenturyskills.org

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2020). Determinants of 21st-Century Skills and 21st-Century Digital Skills for Workers: A Systematic Literature Review. *SAGE Open*, *10*(1). https://doi.org/10.1177/2158244019900176

Yin, R. K. (2016). *Qualitatative Reserch From Start to Finish*.