

Problems, Solutions, and Expectations: 6C Integration of 21st Century Education into Learning Mathematics

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Abstract:

Pendidikan abad 21 membutuhkan integrasi enam kompetensi (6C) ke dalam kelas. Karena itu penting untuk membekali siswa dengan keterampilan yang lebih baik. Survei ini mengkaji problem yang dihadapi guru matematika dalam mengintegrasikan 6C pedagogik di abad 21 ke dalam keterampilan matematika terpadu, dan solusi untuk mengatasi problem tersebut. Studi kualitatif ini mengumpulkan data melalui kuesioner dari 15 guru matematika yang tersebar di delapan sekolah berbeda. Akibatnya, motivasi siswa yang rendah, kesulitan dalam mengintegrasikan beberapa keterampilan, kesulitan dalam manajemen waktu, kurangnya pemahaman konsep siswa, dan kesulitan dalam membuat rencana pembelajaran, serta keterbatasan bahan ajar. Untuk mengatasi masalah ini, kami mengintegrasikan ide berdasarkan menyediakan video (jauh lebih baik jika menggunakan/mendesain video sendiri agar sesuai dengan karakteristik dan minat siswa), kerja kelompok, menyediakan ruang diskusi privat by whatsapp, menyediakan rangkuman materi singkat dengan menarasikan agar bahasanya mudah dimengerti siswa, menggunakan pengatur waktu untuk mengatur waktu, dan meminta referensi dan pertukaran. Buat rencana pelajaran dengan guru lain.

Kata Kunci: Problematika Guru Matematika; 6C; keterampilan terintegrasi Matematika; Solusi Guru

Abstract:

21st century education requires the integration of six competencies (6C) into the classroom. Because it is important to equip students with better skills. This survey examines the problems faced by mathematics teachers in integrating 21st century pedagogic 6Cs into integrated mathematics skills, and solutions to overcome these problems. This qualitative study collected data through questionnaires from 15 mathematics teachers spread across eight different schools. As a result, low student motivation, difficulties in integrating several skills, difficulties in time management, lack of understanding of student concepts, and difficulties in making lesson plans, as well as limited teaching materials. To overcome this problem, we integrate ideas based on providing videos (it's much better if you use/design videos yourself to suit the characteristics and interests of students), group work, providing private discussion rooms by whatsapp, providing short material summaries with narration so that language is easy for students to understand, use timers to manage time, and ask for references and exchanges. Make lesson plans with other teachers.

Keywords: Mathematics Teacher Problems; 6C; Mathematics integrated skills; Teacher Solutions.

Introduction

The 21st century education system is rapidly evolving to meet global educational needs. The Ministry of Education and Culture is improving the quality of educational practices and developing an education system to prepare quality graduates who are ready to face the demands of global developments, the future global society, and the world of work (Seagal, 2022; Waite & McDonald, 2019). According to PISA (OECD, 2019), education is needed to equip students with learning activities that enable them to be active, responsible and involved. They also have a progressive mindset. One of the changes in the education

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system is the need to adapt current education towards the integration of its 21st century skills (ND Safitri et al., 2023; Retnawati et al., 2018; Sah et al., 2022). The Ministry of Education and Culture of the Republic of Indonesia has adopted 21st century competencies to complement the 2013 curriculum for elementary, middle and vocational high schools (Anjarwati et al., 2023; Kim et al., 2019). The revised 2013 curriculum is a form of integrated work between the restructuring of passing grade competencies, aptitude and relevance, expansion, advancement of material, learning revolution, and assessment reform (Humaidi et al., 2022; Waite & McDonald, 2019).

The 21st Century competencies included in the curriculum consist of six terms abbreviated as 6Cs of 21st Century Education. 6C stands for Critical Thinking, Creativity, Collaboration, Communication, Computational and Compassion (Arisoy & Aybek, 2021; Chairunnisa, 2021; Darmayanti, Sugianto, Baiduri, et al., 2022; Kuo & Hsu, 2020; Nelson, 2013; Partono et al., 2021; Rizki et al., 2022; Sugianto et al., 2022). Critical thinking includes activities or the ability to filter, analyze, criticize the information received, and summarize information according to one's expertise (Güner & Gökçe, 2021). This ability allows students to process information received from the environment or media in their brains and understand it later so that students can assess its accuracy and act on this information to think of solutions (Anjarwati et al., 2023; Hasanah et al., 2022). The teacher is asked to decide to come up with a concept. In addition, students will become active and effective lifelong learners, develop understanding, evaluate different insights, develop empowering problem-solving skills, share perspectives and have the appropriate skills to analyze them. Teachers need to develop critical thinking that helps teachers develop teacher structures. Changwong et al., (2018) added that integrating critical thinking improves students' mathematical abilities.

Creativity is a cognitive concept related to creative thinking and innovation in decision making. It is a product, process or interaction that creates new perspectives, thoughts and objects. It also means recognizing problems, determining possible solutions and alternatives, forming hypotheses, testing and evaluating results (Darmayanti, Baiduri, et al., 2022; Faiziyah et al., 2020). All students are creative in their use of language and language subsequently enables new associations, fun combinations and new understandings (Papaleontiou- Louca et al., 2014). Skills foster uniqueness in students and equip them with extraordinary imagination and intelligence. Creative activities encourage students to express what they have learned in new ways (Kariadi et al., 2021; Sah et al., 2023).

Collaboration is an activity of sharing responsibility and accountability for completing tasks based on objectives (Kocabaş & Bavlı, 2022; Sekaryanti et al., 2022). In the 21st century world, collaboration means students participate in authentic and purposeful collaborative learning opportunities to create new knowledge together (Beckmann & Weber, 2016; Fauza et al., 2022). It also refers to students working together to share ideas and difficulties and find solutions to problems. This activity can encourage students to be open to different understandings, revitalize mutual respect and enhance teamwork. Collaboration is recognized as a key educational outcome as organizations increasingly shift to a team-based work environment. Recognizing the increasing need for collaboration in education and the workplace, not just how students communicate and collaborate in groups, but the intentional and meaningful engagement that accompanies collaboration.

Communication is the process of conveying information, ideas, emotions and skills using symbols, words, pictures, graphics, numbers, etc. Beilstein et al., (2021) says that "Communication is the process of sorting, selecting, and sending symbols in such a way as to help listeners evoke responses/meanings from thoughts similar to those intended by the communicator". Communication is the most important thing for children to have in conveying information, sharing opinions and interacting between individuals with other

individuals. This is because with communication skills, children will be able to understand children or other people with these communication relationships, so that children can better understand the messages conveyed and better understand the messages received. Communication skills in the learning process especially in learning mathematics include things namely: (1) Understanding, managing, and creating effective communication in various forms and contents orally, in writing, and multimedia (ICT Literacy); (2) Using the ability to express ideas, both during discussions, inside and outside the classroom, as well as in writing; (3) Using spoken language in accordance with the content and context of the conversation with the other person or the teacher's interlocutor; (4) Apart from that, oral communication also requires being able to listen, and respecting the opinions of others, in addition to knowledge of the content and context of the conversation; (5) Using a logical flow of thought, arranged according to applicable rules (Brouwer et al., 2022; Gray et al., 2020; Qodarsasi et al., 2021; Sugianto et al., 2022).

Computational Thinking or Computational Thinking is a way of thinking to solve problems. The trick is to break down each problem into several effective and efficient parts or phases. It can also be interpreted as a way of solving problems that are solved by humans or systems or both. Based on this concept, there are four main phases of computational thinking, including (de Kamps et al., 2018; Fauza et al., 2022; Kuo & Hsu, 2020; Safitri et al., 2023): (1) Decomposition The first stage, decomposition, breaks down complex problems into smaller and simpler parts. So, Master can find it by solving problems one by one; (2) Pattern Recognition Pattern recognition helps solve problems. At this stage, we look for certain patterns or similarities in the problems; (3) Abstraction The abstraction phase involves investigating the problem, making generalizations, and identifying information. This allows the Teacher to see important information and ignore irrelevant information; (4) Algorithm Algorithm is the phase of developing the system and lists the steps and steps to solve the problem effectively and efficiently.

Compassion or compassion means caring not only for the suffering of others, but also for oneself. Therefore, it is necessary to be sensitive and touched by the suffering of others. However, it must be admitted that neither they nor the general public are perfect (Schiuma et al., 2022; Ziaulhaq & Sen, 2021). In a way, it is the awareness that one is keeping one's balance, but if one fails, one is in misery and can get back up. In education, compassion is the most important skill to learn. Love is a caricature that arises because the basic thing that must be instilled in parenting is the strengthening of the child's personality. This is practiced in the form of behavior that is in accordance with the prevailing values and norms. This includes the school's commitment to helping young people become responsible, caring and contributing citizens. Again, we often need competency connectivity, human connectivity in the world. Technical support is used as a tool to introduce the child to others.

Integrating the 6Cs into the teaching and learning process offers several benefits. First, it can help students become effective language users, critical thinkers, and constructive agents of social change (Kováts & Takács, 2022; Sah et al., 2022; van Laar et al., 2020). By connecting students to its 6Cs, we can achieve the ultimate goal of smart growth and sustainability. Students are also equipped with additional modern competencies needed during this period. Having high-ability students will go a long way in expanding our country's educational achievements and making it easier to compete in the global advancement in the future (Fauza et al., 2022; ND Safitri et al., 2023; Sah et al., 2023; Sekaryanti et al., 2022). In addition, by integrating the 6Cs with Integrative Mathematics Skills, students gain teacher benefits from integrated learning of math skills and the six skills of 21st century teaching. Because of its importance, the 6Cs should be seen as integrated into the learning process, as required by the revised curriculum (Weathers & Aragón, 2019). As educators, we need to consider the fundamental changes currently taking place in 21st

century education and, more importantly, how these changes affect the practice of teaching mathematics (Darmayanti et al., 2022; Rizki et al., 2022; Vidyastuti et al., 2022; Wulandari et al., 2022). While this change in the education system is bound to have an impact on their mathematics learning in the classroom, both teachers and math practitioners are looking for new pathways and systems-based learning methods.

Mathematics teachers are currently facing the problem of integrating 21st century competencies into the teaching and learning of integrated Mathematics competencies (Bray & Tangney, 2016). In 6C integration, teachers play a key role in helping students best achieve their educational goals. Ensuring that a student masters his 6C skills in the 21st century education era is a big problem for teachers. Teachers must use innovative learning to develop the skills of their students. Teachers must have internal skills to be able to use learning approaches, strategies, methods and models (Darmayanti et al., 2022; Rahmah et al., 2022). By choosing appropriate and innovative learning methods and models, a student can achieve his six competency skills (Schiuma et al., 2022). Therefore, teachers need to creatively design learning methods that are in accordance with the needs of the times in order to bring out the best potential of students.

A teacher has two main roles in the classroom, directing and managing educational activities. It also creates lesson plans for the learning process and integrates the 6Cs into innate skills. Today, so many teachers are incorporating their 6Cs into their comprehensive math skills to keep up with the evolution of the global education system. Integrating the 6Cs can be teaching, informing, solving problems, motivating student learning, and assessing. Teachers equip students with learning based on the concepts of critical thinking, creativity, collaboration, communication, culture/citizenship, and character/connection building.

Method

research is a qualitative type of research that uses a theoretical approach (*grounded theory*) (Nechully & Pokhriyal, 2019). This approach was chosen because it is the best way to analyze data and develop theory from social studies data. Data was collected through public questionnaires to allow for more meaningful and in-depth discussions. Questionnaire in the form of *Forms from Google (g-form)* and distributed individually to each eligible participant because participants were selected based on research needs. The researcher then conducted unstructured or in-depth online interviews with selected participants. Interviews were conducted only with certain participants because the responses of other participants were clear and actionable, but the researchers refined their responses to the questionnaire and asked for more detailed explanations. The interview lasted approximately 45 minutes for each participant. *Online* recorders and researcher notebooks were used throughout the interview process to assist with data collection and to avoid missing data being disclosed by participants.

Fifteen public and private SMA Mathematics teachers in Pasuruan participated in this study. This study uses *purposive sampling* to select subjects by determining whether to include or exclude benchmarks in selecting this study (Ruswanto et al., 2018). Here are the benchmarks: (1) Teachers are required to teach on behalf of the City /Regency Pasuruan, (2) They graduated from the mathematics department and are currently teaching mathematics. More importantly, (3) his experience and understanding of the integration of mathematical skills integrated with the 6C of 21st century education, (4) has a minimum of five years of teaching mathematics experience, (6) the minimum age of teachers is 25-45 years.

After the data is collected, the data is analyzed in two steps. First, the researcher analyzed the questionnaire to understand the problems faced by teachers in integrating their

6Cs into the classroom and find solutions to overcome these problems. The detailed steps are shown in Figure 1.

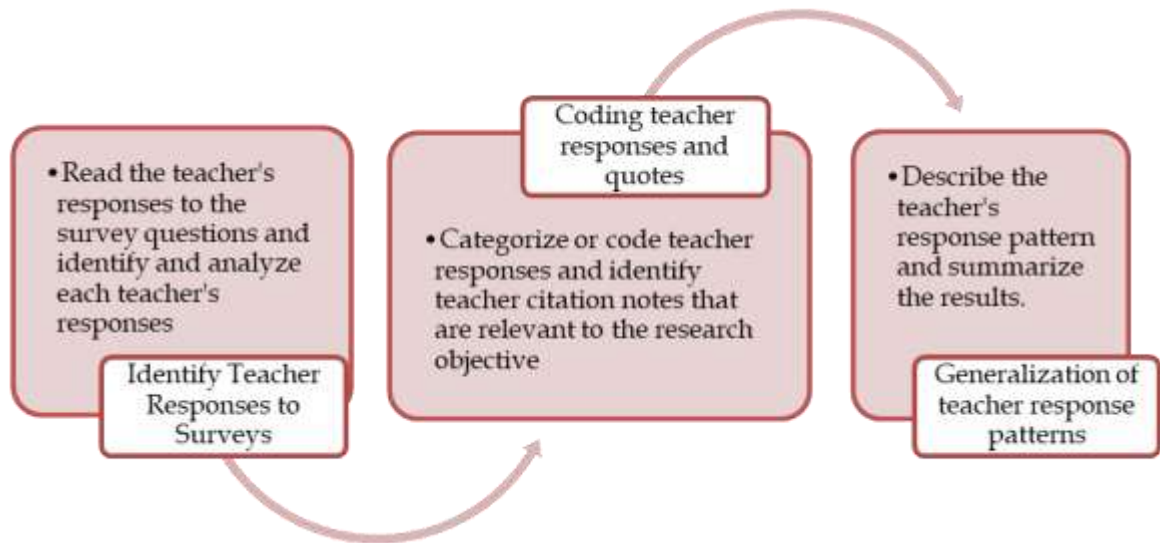


Figure 1. Data analysis procedure flow

Second, the results of the interviews were transcribed and analyzed using coding. The aim is to classify the data obtained to provide an overview of research ideas (Saldana, 2018). First, we examine the data obtained by the open coding method using the concept of time. Data about research objectives are then collected and categorized. Finally, I summarize the questionnaire data and interview results and report them.

Results and Discussion

Results

Problems for teachers in integrating the 6C of 21st Century Education into Mathematics skills.

The problem for teachers in integrating the 6Cs of 21st century education into their mathematics skills is referring to the results of questionnaires and interviews. Based on the results of the questionnaires and interviews, the researcher found that teachers faced several problems in integrating their 6C into the classroom, as shown in Figure 2.



Figure 2. Teacher's problem in integrating 6C in learning mathematics

As shown in Figure 2, it is found that there are six problems faced by teachers in integrating 6C in the classroom. The problem becomes a problem for math teachers where the heaviest problem faced by teachers is low student motivation and the lightest problem is making lesson plans that include the integration of 6C. Detailed explanations and expressions of teacher problems in dealing with problems are reported as follows.

1. Student Motivation

Motivational desire/will and individual interest in achieving a certain goal. Learning motivation is the key to student learning success. However, each student has a different desire/motivation and interest in participating in the learning process in class. Students who are low to want to learn is the problem most often expressed by teachers. So that this problem creates its own problems for teachers. Teachers are required to seek how to provide solutions in order to increase student motivation.

Researcher: "In dealing with low student motivation, what did the teacher do as an effort to overcome this problem?"

Teacher 5: "Yes, starting from giving enthusiasm to the children, paying attention by asking what difficulties are experienced, providing interesting activities so that students are motivated."

Thus the teacher has sought to increase student motivation. However, in Figure 2 it can be seen that students' motivation is still low. Low student motivation is the toughest problem for a teacher. Another problem was found related to the low motivation of students, namely that some students had little motivation to participate in class activities, even though the teacher carried out interesting activities according to the needs and levels of students. As a result, when these problems are still the toughest problems for students, then teachers are required to integrate 6C, then this is of course an obstacle. Thus, teachers cannot integrate their 6Cs smoothly. This is especially true for unmotivated students. Furthermore, decreased motivation also affects activities during the learning process. In this case,

Teacher 7 said: "In fact it is very difficult when integrating 6C smoothly. Because there are still students who do not want to follow the learning process. Some students participate enthusiastically in class activities, others do not. Therefore, 6C integration may not work as expected".

Teacher 2 also stated: "Low student motivation also affects student activity in class. One of the problems I found in integrating the 6Cs is low student motivation. Some students are less motivated, less active, and less interested in participating in class activities. Some

experience delays in thinking and learning. This definitely affects the progress of learning and the smooth integration of the 6Cs”.

so it can be concluded that the problem of a mathematics teacher in integrating the 6C of 21st century education in mathematics skills is due to low student motivation.

2. 6C Skills

The second problem is related to how teachers experience problems in integrating the 6C of 21st century education in mathematics skills, especially when faced with the learning process as its implementation. The problem posed by the teacher is the difficulty in integrating various competencies such as critical thinking, creativity, written communication, and culture, as shown by Teacher 14.

Teacher 14 said: "In the 21st century competencies that students must have, creative and critical thinking is not used by all students. Teachers encourage students to be critical, but rarely discuss it in class. In addition, it is difficult to encourage students to be more creative in their learning. For example in activities to complete assignments (both at school and at home), or to create by creating new things.

Teacher 1 added:

Teacher 1: "Some abilities are hard to integrate. Written communication skills, creativity to stimulate students' creative thinking and collect questions, and critical thinking skills to evaluate student ideas and identify and solve problems.

Furthermore, teacher 5 also said:

Teacher 5: "The problem arose when I tried to integrate one of the 6C's. During the learning process, especially in class assignments and discussions, students must always think critically about simulations. If I don't see them, they don't think critically. It is also very difficult to find creative students. I had them do the assignments differently, but I found that most of the students' work was more or less the same. Especially during this transitional period in this new normal era, I have to observe from the start regarding students' abilities. During a pandemic, students' skills may change, this can be seen when students' grades in assignments are the same. Hard to tell the difference."

so it can be concluded that the problem of a mathematics teacher in integrating the 6C of 21st century education in second mathematics skills is due to difficulties in integrating one, even several competencies in learning.

3. Math Concept

In the third problem, the teacher's problem is because of the students' ability to understand the concept. Most teachers indicated that students' lack of understanding was one of the problems in integrating the 6Cs smoothly into their classes. Also, they are high school seniors studying mathematics at school for a limited time. They also tend to understand concepts when using or presented with problems they often/have encountered in everyday life. Moreover, students tend to be able to solve simple concept. Even so, this problem remains a major problem for teachers. Student understanding is the foundation of students to be able to use it in solving problems. This is exacerbated by the low ability of students to absorb the material, as said by Teacher 1.

Teacher 1: "This problem is very common. In other words, students' concept is lacking. Due to a lack of reading and arithmetic, students usually immediately become obsessed with working on questions without reading first. As a result, many students get stuck in their own way of solving problems, in other words, stopping before finding a solution. Especially when calculating students tend to use a calculator. This was also found when discussing tasks in groups.

Furthermore, teacher 5 also said:

Teacher 5: "One of the problems is the lack of understanding of students in conveying the concepts they have learned. It is very difficult to bring critical thinking, communication and culture into the classroom when students have limited understanding of what to convey. These three competencies require students to have a good understanding. I especially need it to make my point in front of the class or to discuss cultural issues that tend to require a broader understanding."

so it can be concluded that the problem of a mathematics teacher in integrating the 6C of 21st century education in the third mathematical skill is due to difficulties in understanding mathematical concepts. This student's difficulty will affect other mathematical abilities, especially the ability to think critically, communicate, and collaborate.

4. Teaching materials

In the next problem, namely the fourth problem, which is a teacher's problem, namely due to limited teaching materials in supporting 21st century education. This limited teaching material is because almost all teachers only focus on printed books from certain publishers that have been determined by the school. However, it was found that there was one teacher who used digital books but the book was not from the design/development but only took it by downloading it from the internet. This is due to the teacher's difficulties in designing teaching materials that are in accordance with the demands of the Ministry of Education and Culture which are technology-based.

Teacher ignorance is related to how to operate and how to design technology-based teaching materials, be it websites, e-books, videos, or other applications. Teachers tend to prefer a safe way of teaching in the way they usually teach, the important thing is that the material is conveyed. However, it is undeniable that the books used by students to support their learning are not optimal. Not all students have the same interest in reading. Not all students are able to understand the material in the book. Another thing is that not all books that have been used so far have content that suits the needs of students. As a result, teachers have difficulty integrating 6C in learning. According to Teacher 7 which states:

Teacher 7: "Teaching materials are important in bridging the interaction between teachers and students when students are faced with demands to study independently. The books that are currently used are not supportive in helping teachers to integrate 21st century 6C in mathematics learning. The material presented in the book is found to only have 1-2 skills such as critical thinking skills or creative thinking skills."

Furthermore, the teacher also said:

Teacher 1: "One of the problems is the lack of supporting teaching materials in conveying mathematical concepts. Teachers also find it difficult to develop themselves because they are clueless. It was already very difficult for students to read, instead they were presented with books with writing that sometimes I myself had to read over and over again. If it's like this, it's a waste of time, the writing isn't simple, so it's hard to understand. Look at their books, they are neat and smooth, that's the teacher, the students never open or read books. So how can we integrate 6C while my skills and teaching materials don't support it."

so it can be concluded that the problem of a mathematics teacher in integrating the 6C of 21st century education in the fourth mathematics skill is due to difficulties in making teaching materials that can contain the 6C component. This teacher's difficulty will affect students' mathematical abilities where students will get bored with printed books that are often used. It does not vary, the language is difficult to understand, students and teachers

have difficulty interpreting the meaning of the books. These books are also rarely brought by students because of their large size, and there are books that have up to hundreds of pages. As a result, students rarely bring books to school.

5. Time

The fifth problem is related to time management. Time management must be a major concern in carrying out the teaching and learning process. All activities can be carried out smoothly according to plan at the right time. However, some teachers had difficulty allocating time and some activities were running poorly. Teacher 5 said:

Teacher 5: "Some abilities are difficult to integrate. Written communication skills, creativity to stimulate creative thinking in students. Students need more time to complete assignments for each activity. With so much to do, it's hard to manage a teacher's time well."

Furthermore, the teacher also said:

Teacher 1: "One of the problems is managing time. This problem is a problem that requires a solution. It is difficult for teachers to manage time properly. As a result, the teacher may not be able to carry out some activities properly in learning activities. Also, some activities that are not completed at one meeting must be continued at the next meeting. This will limit the time for the next teacher meeting."

Then,

Teacher 7: "I have tried to limit the time for each activity, sometimes the 6C integration is very interesting, but I need to divide the time for each activity wisely. Also, remember that every activity is important and takes a lot of time. All teachers want to be able to smoothly implement what is planned in their lesson plans, but sometimes there is not enough time."

so it can be concluded that the problem of a mathematics teacher in integrating the 6C of 21st century education in the fifth math skill is due to difficulties in time management. Time constraints cannot overcome so many problems.

6. RPP

Some teachers find it difficult to integrate the 6Cs and design lesson plans, especially class activities and materials, to suit the level and needs of their students. Teachers also indicated that more care and attention is needed in creating teaching materials as they are an important medium in teaching subjects. The following are statements from several teachers.

Teacher 11: "Before we brought 6C into the classroom, we had a big problem. It was for making lesson plans. Note that lesson plans must be appropriate to the level and needs of students, learning activities must be interesting to make learning 6C enjoyable, and materials must be meaningful and comprehensive"

Then,

Teacher 5: " The preparation of lesson plans is very difficult, especially for organizing learning activities and making teaching materials. This is because we have to be very careful and creative. Other than that, it's all about successfully integrating the six abilities".

Then the teacher also added:

Teacher 1: " The teacher may have difficulty organizing class activities because the teacher pays too much attention to the interests and learning outcomes of his students. I always try to make my class activities interesting and meaningful so that my students can enjoy learning".

so it can be concluded that the problem of a mathematics teacher in integrating the 6C of 21st century education in the sixth math skill is due to difficulties in designing lesson plans because the teacher is too focused on students' interests and learning outcomes and difficulties in compiling them by linking them in integrating the six abilities as demands of 21st century education.

Solutions expected by teachers in integrating the 6C of 21st Century Education into Mathematics skills.

The researcher investigates the problems faced by teachers in integrating 6C and asks how they overcome problems in integrating 6C. Researchers know that teachers have different solutions to overcome which is shown in figure 3.



Figure 3. Teacher's problem in integrating 6C in learning mathematics

As shown in Figure 3, there are six solutions developed by teachers to overcome the 6C integration problems/problems. Among all the solutions mentioned in Figure 3, giving videos is the best solution and most often chosen by teachers to overcome 6C integration problems. Detailed descriptions of each solution can be found below.

1. *Provide learning videos*

One way he solves this problem is by providing interesting videos. Some teachers find it effective in motivating students to learn. They indicated that they played short interesting videos to stimulate students' interest in learning before giving the material. If students are interested in learning, they can integrate the 6C more easily. Providing videos helps less skilled students understand the material better.

A teacher 7 said:

"In my opinion, providing videos helps less skilled students to understand the material better. may be needed. I usually use video when integrating critical thinking, culture and collaboration. Videos are usually taken from websites or YouTube".

2. *Make room for WhatsApp*

One way to solve this problem/problem is to make room on *WhatsApp*. Some teachers find it effective in motivating students to learn. They noted that the teacher provided motivation by asking students if they had helped themselves in giving this attention before presenting the material or after presenting the material shared in group/private chats. When students respond positively to the teacher's attention then influences them positively, they can integrate the 6Cs more easily. Students and teachers

spend almost all of their time viewing or using *wathsaapp*, so providing a space to interact with students to remind them and carry out activities is a necessary solution. This is especially useful for unmotivated students so they don't feel embarrassed if they can't keep up with their friends.

A teacher of 5 said:

"In my opinion, giving space via WhatsApp helps students who are less competent, shy, and quiet to understand the material better. Even attention may require students to pay attention, but it actually helps them understand the material rather than always responding to the teacher. I usually use the Wathsapp Room when I integrate compassion, critical thinking and creativity through dialogue, giving attention and feedback to materials and questions".

3. Implementation of peer tutor group work:

Most of the teachers believe that grouping students is the best way to solve the 6C integration problem in the classroom. It is a good medium for students with different levels of ability and motivation to study together, discuss material, share ideas and difficulties to better achieve learning goals.

One teacher 1 said:

"One solution is to divide students into several groups and discuss theory. I find that they enjoy brainstorming and trying to find solutions to common problems, making collaborative learning more fun and more positive".

Some teachers also point out that group work can motivate students to learn, especially if they are not motivated.

Teacher 2 said:

"Group work is a great solution to motivate students to study because they prefer to study with their friends. In addition, group work can also encourage students to think more critically and creatively. Students are encouraged to think more critically because they feel the need to react to what members think. They are also encouraged to be more creative, especially in completing their work, with the hope that their work will be superior to other groups.

4. Give a summary:

Some teachers have experience providing classroom and home-study summaries, and have shown that they are highly effective in helping teachers integrate the 6Cs.

One teacher of 8 said:

"I believe that the integration of 6C will be more successful if we include Provision of summaries solving problems faced by teachers".

and more importantly, like

what teacher 11 said:

" Students enjoy the learning process".

The teacher wants to make learning fun by giving students an interesting summary when we give them a quiz in the next class. Interestingly, if the student doesn't reply, Pickett's friends receive a reward for helping clean up the classroom the next day.

Teacher 7 says:

"I hope that this effort will make my students happy and help them absorb the material better. I give this summary at the end of almost every meeting, from material tricks that are easy to understand to those that are difficult to learn. Students respond well".

This aims to enrich students' vocabulary (understanding) by telling concepts by providing a summary in the form of short reading material whose impact is compassion and friendliness. This shows that collaboration by making pickets can help teachers participate in class.

5. *Use timers:*

Time management is an important aspect in learning so that it runs smoothly. Most teachers feel that they often run out of time, so that some activities are not carried out properly or are even missed. However, some teachers are taking the initiative to use timers to help with time management.

Teacher 3 reveals:

"Use the timer to time each activity scheduled in the Teacher's lesson plan. A little stiff, but it works for me. So that all activities can be carried out properly."

6. *Reviews:*

Find references and share with other teachers to create lessons and materials. And one of the last is the teacher's solution to overcome problems, especially when making lesson plans.

Teacher 11 said:

"First, I looked for references to organize class activities, with a special focus on the integration of the 6Cs. Teachers should read more references and be creative in designing classroom activities rather than just drafting activities listed as core skills".

Teacher 9 also revealed that:

"He read several references focused on integrating the 6Cs into math classes and found a few activities he could adopt. Then share and discuss with other math teachers to determine the best activities for students based on their proficiency. I also make teaching materials with other math teachers"

In addition, some teachers explained that we can also develop class activities during the learning process if we feel it is necessary so that they are not as successful as we planned.

As teacher 7 said:

"It is not easy to make RPP. So, after making a lesson plan, I observe how it is implemented in class. When the learning process seems less fruitful, the learning activities need to be changed immediately so that the RPP can be revised. In my opinion, dealing with real-life situations in class can make lesson planning easier and more meaningful."

Discussion

The discussion of this study explains the relationship between findings and theory. Based on the findings of this study, teachers face several problems in integrating their 6Cs into math skills. These include low student motivation, difficulties in integrating several competencies, students' mathematical concepts, teaching materials, difficulties in time management, and difficulties in designing lesson plans. The problem most often cited by teachers is low student motivation. As an important and critical factor for the success of the learning process, students must be interested and motivated to learn. Otherwise, the learning process will not work. When students are motivated and willing to learn the material, the teacher can successfully teach. The second problem is the difficulty of integrating various competencies such as critical thinking, creativity, and communication. (Güner & Gökçe, 2021) shows that skill integration can be confusing for teachers. Because this

requires a good understanding of discourse and the ability to use the material appropriately. In addition, integrating these competencies can encourage students to think critically about material, be more creative when making assignments, and communicate when communicating ideas in class. Hard makes it harder.

Students' conceptual understanding of understanding vocabulary in poor material makes it difficult for the teacher to integrate the six Cs into the classroom. Khuong, (2015) has pointed out, student factors that can hinder the learning process are often related to poor language and vocabulary, and unwanted rebellion against teachers and peers. Some teachers reported that students did not have sufficient vocabulary in mathematics other than those related to daily activities. Teachers feel a bigger problem when integrating. This also occurs in the integration of critical thinking and communicative activities. Students often criticize the material and convey their thoughts in silence and attitude. As a result, students cannot say what is understood or what is not understood, the attitude is shown by the indifference of students to the work/tasks given by the teacher.

Furthermore, the next problem is the limited teaching materials. To learn how to use the material so that the learning process is effective. Material supports learning success. One of the materials is in the form of tools or facilitators which are distributed to students during the teaching and learning process. When creating materials, we educators can create existing materials and adapt them to the needs of our students. An educator or teacher can also be a writer when developing teaching materials. Educational media supports students in the learning process. Interactive teaching materials are teaching materials that make students more active and independent in completing assignments. The teacher is only an intermediary in the teaching and learning process. Materials are considered appropriate and appropriate if they are designed and produced based on learning ethics, have a purpose, and are meaningful to students. Educators are expected to provide a form of benefit and encouragement to make teaching tools more effective. Visual aids help students in the teaching and learning process so that they can be accepted. This selected learning device is more optimal because it allows students to achieve extraordinary learning achievements.

The next problem is time management. Time management is a major problem in any teaching and learning process because teachers are often dissatisfied with the time allotted for each meeting. Sufficient time is needed for students to familiarize themselves with the material, even though the reality is different. In fact, teachers often need more time to carry out learning because some activities are not completed. This is because many activities take time to complete as well, Coyle says, because it takes a lot of preparation to create materials and projects and to plan activities to carry them out (Sousa, 2021)

Regarding the problems faced by teachers in integrating 6C, several teachers have solutions to overcome problems in integrating 6C, such as lesson planning. Many teachers state that student grouping is effective in helping students acquire material. Because students can share their understanding with their friends and jointly find solutions to the problems they face. Compared to face-to-face learning between teachers and students, cooperative learning is more effective in integrating students into the learning process. Collaborative learning, or the so-called learner mode, can have a positive impact on student motivation (Wang & Fu, 2021), because material can be obtained spontaneously later. for good motivation. In addition, noted that collaboration and evaluation can be beneficial for the learning process (Rahayu & Dewi, 2018).

Providing engaging videos can also help motivate students and make material more accessible. It is an enjoyable learning experience for students who need a break from the stressful learning of mathematics (van der Meij et al., 2017). Teachers can watch videos in the Pre-learning area to revitalize Master's students' planning on the topic or increase their interest in learning. In the Learning section Teachers can view videos for individual study

and group discussion. Watching interesting videos helps students understand the material better than just reading a textbook without visualizations. In addition, holding games is also a good initiative to provide a different atmosphere for students. As noted by Marekhi quoted in (Kramer et al., 2020), to master their communication skills, teachers need to consider implementing various approaches and various types of communication activities that are integrated into the classroom. There is. Also, games can encourage students to practice their communication and collaboration skills because they need to communicate and work together with other students during the game. It also helps teachers integrate critical thinking skills and creativity. Because to successfully overcome the game, students need to think critically and take creative action.

A creative solution that some teachers use is to use a timer to time class activities. Although simple, some teachers find it effective to allocate time for each activity so that it can be carried out properly. The final solution, especially for making lesson plans, is to find references and share them with other teachers. Several teachers stated that they had read several references in the form of articles discussing 6C integration, how to integrate 6C, making good lesson plans for integration skills, etc. Although it is difficult for teachers to create lesson plans that include 6C integration, teachers find a solution because the integrated approach creates a more meaningful, comprehensive, fun and engaging experience for students to learn in class. must be able to realize that it gives more space for (Mercier & Lubart, 2021). Integrating skills give teachers room to develop their students' language skills. Because students can demonstrate their communication skills orally and in writing and then achieve success in their communication academically (Fernández et al., 2021).

Finally, the final task revealed by the teacher is to make a lesson plan. This predates the integration of the 6Cs, but the lesson plan is a guide to how learning takes place in the classroom, so it is important to address this. Failure to make lesson plans that are not in accordance with students' abilities can have an impact on student learning outcomes in class. Most teachers find it difficult to organize classroom activities that involve the 6Cs and create appropriate materials. The number of competencies that must be mastered forces the teacher to consider whether the activity covers all competencies correctly. It also encourages teachers to be more alert and creative in managing class activities and learning materials.

Conclusion

Integrating 6C into Integrated math Skills is one of the evolutions in educational practice that meets the needs of the 21st century. The aim is to improve students' skills and prepare graduates to face global and social developments and societal demands. However, in the process of integrating the 6C into math skills, teachers face several problems. In particular, low student motivation, difficulties in integrating several skills, difficulties in time management, lack of understanding of student concepts, and difficulties in making lesson plans, as well as limited teaching materials. The problems faced by teachers are influenced by students and teachers themselves. As a teacher, we must be able to master class assignments to avoid learning failures and learning objectives that are not achieved. This study summarizes some of the solutions teachers found to overcome the problem of integrating 6C into their integrated math skills. This includes providing videos (much better if you use/design videos yourself to suit the characteristics and interests of students), group work, providing private discussion rooms by watshapp, providing short material summaries with narration so that the language is easy for students to understand, using timers to set a time, and ask for referrals and exchanges. Make lesson plans with other teachers. Teachers have demonstrated that the above solutions can overcome their

challenges in integrating 6C into their classrooms. In addition, the learning process was successfully carried out and the learning objectives were achieved.

Proposals are intended for teachers and other researchers. Since the integration of 6C is new in education, there should be some problems in integrating 6C into the classroom. And maybe there are other aspects that are not discussed in this study for future researchers. Future researchers are expected not only to know about the problem, then only explore solutions from sources but also focus more on the hopes and desires that should be obtained in supporting teachers in integrating 6C in learning mathematics. For example, by providing or creating teaching materials that are really needed, especially those that are closely related to technology, which can include 6C competencies. This will be a new example or waca for teachers who are still having difficulties about what teaching materials should be owned or developed so that students can have 6C. It is further hoped that other researchers will study the same topic with a different focus.

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