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Incorporating Thinking Skills and ICT-Competence to Optimize Teachers' Professional Competence in the 21st Century

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Abstrak

Cara Berpikir dan Kompetensi TIK merupakan bagian dari keterampilan abad 21 yang menjadi kebutuhan bagi guru dan siswa saat ini. Perkembangan era informasi yang sangat pesat melalui kemajuan teknologi mendorong masyarakat untuk memiliki kemampuan dalam mengakses, menyerap, menginterpretasikan dan mengevaluasi informasi dengan baik. Pengabdian masyarakat ini dilakukan untuk membekali para guru dengan keterampilan abad 21 yaitu Cara Berpikir dan Kompetensi TIK serta bagaimana mengintegrasikan keduanya dalam perangkat pembelajaran seperti Rencana Proses Pembelajaran (RPS) dan kegiatan pembelajaran di kelas. Metode yang digunakan dalam melaksanakan kegiatan tersebut adalah sosialisasi dan pelatihan guru dengan peserta sebanyak 21 orang guru. Mitra kegiatan pengabdian ini yaitu Yayasan Pendidikan Daarul Hikmah Al-Madani Kota Tangerang yang mencakup dua sekolah yakni MI Darul Hikmah dan SMP Garuda. Hasil kegiatan menggambarkan bahwa para guru setuju cara berpikir dan Kompetensi TIK penting bagi siswa di masa sekarang. Selain itu, untuk menghadapi tantangan abad 21 saat ini, mengharuskan guru untuk meningkatkan professionalisme guru abad 21. Kegiatan pengabdian ini memfasilitasi guru mendapatkan pelatihan terkait bagaimana merumuskan dan mengintegrasikan indicator cara berfikir dan kompetensi TIK dalam perangkat pembelajaran. Dengan demikian diharapkan guru dapat merumuskan indikator cara berpikir dan Kompetensi TIK secara mandiri di kemudian hari dan mengetahui bagaimana mengintegrasikan dalam perangkat pembelajaran yang dapat membantu mereka untuk mendorong siswa dalam tantangan saat ini di abad ke-21.

***Kata kunci**: Keterampilan Abad 21; Cara Berpikir; Kompetensi TIK; Kompetensi Profesional Guru*

Abstract

Thinking skills and ICT-Competences as the skills in 21st century become a necessity for teachers and students nowadays because the information age is currently developing rapidly through the advancement of technology. Today's society must have the ability to access, absorb, interpret, and evaluate information properly. This community service is conducted to equip the teachers with 21st-century skills; Thinking skills and ICT-Competences and how to integrate both of them in learning tools such as Rencana Proses Pembelajaran (RPS) and learning activities in the classroom. The method used in conducting the activity is a socialization and teachers' training with 21 teachers participating. The partner of this PKM activity is Daarul Hikmah Al-Madani Education Foundation which includes the teachers from

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Garuda Junior High School and MI Darul Hikmah in Tangerang Municipality. The result of the activity illustrated that teachers agree that thinking skills and ICT Competence is important for students in the present and this community service facilitate the teachers to improve their professionalism to face 21st century challenges in education. In improving the professionalism of 21st-century teachers, several ways can be done, one of them is participating this socialization and training about formulating and incorporating thinking skills and ICT-Competences in teaching and learning. Teachers are expected that in comprehending how to formulate indicators of thinking skills and ICT Competence and how to integrate in learning tools can help them to encourage the student in the current challenges in 21st century.

Keywords: 21st Century Skills; Thinking skill;, ICT-Competences; Teachers' Professional Competence

INTRODUCTION

The advancement of modern civilization has modified the competencies and skills required of both students and teachers (Widyaningrum et al., 2019). Teachers and students must identify and use 21st century skills in the contemporary globalized world (Shopia et al., 2022). Technology advancement and thinking skills, as one of 21st century skills, contribute not only to daily life but also to education for accessing and interpreting information. In the technology era promote the various information that should be identify and analyzed the correctness (Griffin, P., Care, E., & McGaw, B, 2012). Currently, technology such as social media, websites, apps, search engines, and other tools make it easier to get the information for daily use as well as to improve teaching and learning activities (Bosamia, 2013).

In addition, the widespread accessibility of information in the present information age has made it necessary for people to acquire literacy skills in media literacy, information literacy, and technological literacy to access, analyze, use, and evaluate information correctly (Eisenberg, 2008). Information and technology affect everyone in all contexts, including public service, business, and education. The core of education is information and knowledge. In other words, gathering, processing, and communicating information is necessary for teaching and learning to occur (Eisenberg, 2008). In education, teachers share information that will be accepted by the student through various media (Hussin, 2018; Ali, Md. Sazanah, 2020). In the past, the textbook were employed as the main source of educational information but it has been rapidly changing because of the explosion in information technology and networked information (Champa et al., 2019). Similarly, citizens are increasingly using web-based, electronic sources and services for information in government (Eisenberg, 2008). In short, due to this change, both teachers and students need to be literate in technology also in processing information.

In fact, the ability to think carefully in processing information in the real life situation is needed (Griffin et al., 2012). UNESCO Digital Literacy in Education stated that digital literacy not only employ the media or digital platforms actively but also the most crucial elements of digital literacy that future computer users and ICT professionals should have processed such as the accessing, managing, evaluating, integrating, creating, and communicating information individually or collaboratively in a networked, computer-supported, and web-based environment for learning, working, etc (UNESCO Institute for Information Technologies in Education, 2003) (UNESCO, 2011). This circumstance is directly tied to 21st century skills, which need for cognitive abilities or thinking skills to support ICT competencies. People must train their thinking skills by practicing digital literacy. In the education, the teacher's role is significant in helping the students to train their thinking skills in absorbing and interpreting information appropriately through the usage of ICT (Gaible, 2020) as well as the usage of ICT-Competences actively and

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appropriately support teacher and student to build an active teaching and learning activity (Ghavifekr & Rosdy, 2015).

However, according to the findings conducted by (Shopia & Iskandar, 2019; Shopia et al., 2022; Fadhilah Hamid & Sulistyaningrum, 2019; Bandan & Dewanti, 2019; Purnawati & Iskandar, 2019) stated that the majority of Indonesian educators are not proficient in incorporating ICT into their teaching and learning activity. Moreover, according to the finding conducted by (Sulistyaningrum, 2021) and stated in PISA that the thinking ability of Indonesian children is relatively low. The reason behind this is that Indonesian students are not adequately prepared to respond the contextual concerns that require critical thinking, reasoning, and creativity in order to resolve it. Besides, in practicing Higher Order Thinking Skills (HOTS), Indonesian students continue to score poorly in question analysis and response. It is supported by Rothbarr et al (2021) that 21st century skills have not been incorporated in Indonesian educational institutions and teachers are still lack information and understanding about how to teach students consequently thinking skills among Indonesian students are low (Kuntarto et al., 2019) (Sulistyaningrum,2021). In short, the researchers provide the materials for this community service with the justifications mentioned above.

The partners in this community service encounter those circumstances as well. This issue discovered after conducting a situation analysis or need analysis is teachers' lack of ICT Competencies and thinking skills as well as how to integrate them into teaching and learning activities. In fact, the teachers' understanding of ICT such as the employment of hardware as a tool for presenting materials in front of the class, the employment of a hand phone in uploading or downloading assignments or slides, the employment of some internet device for accessing relevant materials, the employment of application or tools for conducting virtual learning. However, the usage of ICT is more when it comes to developing and applying thinking skills for utilizing technology to access, manage, assess, integrate, create and communicate information. Besides, some teachers also do not yet completely know what skills are included in Thinking skills and the level of ability to use ICT-Competences which refers to UNESCO ICT-Competences. In short, it becomes the problem that should be found the solution through this community service.

Based on these problems and background, the goal of this community service is to socialize and train the teacher regarding to the indicators to develop students' thinking skills and the ability to use Information and Communication Technology (ICT). (Shopia & Iskandar, 2019), stated that the incorporation of thinking skills and ICT-Competence can be completed by formulating indicators for both of them. Then, based on the findings conducted by (Shopia & Iskandar, 2019) stated that one way to implement 21st-century skills is by integrating 21st-century skills indicators into learning tools, namely the syllabus or lesson plan (RPP), the learning process class and assessment. Through this PKM activity, the teacher will receive socialization related to 21st-century skills in the learning process and training in formulating 21st-century skills indicators and reinforcing them in the learning process. It is one of the alternative ways to enhance teachers' professional competence in 21st-century skills.

METHODOLOGY

Equipping teachers with the understanding of 21st century skills, particularly ICT competencies and thinking skills, is essential for enhancing teacher professional competence in these domains (Sulaiman & Ismail, 2020). This community services was conducted based on the research findings that was investigated to generate the literature or theory of thinking skills and ICT-Competences (Shopia et al., 2022). Then, the research findings produced the indicators of Thinking skills and ICT-Competences including how to formulate the indicator and how to

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integrate those indicators in teaching and learning activities that will be delivered through the socialization program and teachers' training. In the other words, this community service was taken place based on the result of previous research that had been conducted by the authors. The participants who participated in this community service are teachers. There were twenty-one teachers contributed from the total in school are twenty-six. Based on the nominal, the sample of the data is sufficient for contributing to this community service. Furthermore, in conducting this community service activity, some steps were conducted as follows;

1. **Need Analysis**
   A Forum Group Discussion (FGD) with the principal and some teachers from MI Darul Hikmah and Garuda Junior High School was conducted as the step of need analysis. FGD was conducted to discuss about the participants' understanding of 21st century skills and the issues they were facing. The principal and teachers were also involved in the conversation regarding teacher competency, including what areas or skills need improvement and what the problem faced by the teachers. This activity was carried out on Friday, September 23, 2022, from 09.00 –12.00 WIB.
2. **Socialization**
   After conducting Forum Group Discussion (FGD) as the process of need analysis with the principal and some teachers in the school, socialization was taken place to share and encourage the teachers in contributing to this community service. Teachers' understanding of how to enhance their professional competences and the 21st century skills that both teachers and students should learn and practice was also facilitated by socialization activity. The knowledge which was shared with teachers is the research findings of previous research that had already been conducted and published. This activity was taken place on Tuesday, 11 October 2022 from 09.00- 12.00 WIB. In short, at this stage of socialization, the emphasis is on teacher understanding related to Teachers' Professional Competences and 21st-century skills.
3. **Teachers' Training**
   Teachers' training was taken place on the same day at different times after conducting socialization activity. Teachers' training was conducted on Tuesday, 11 October 2022 from 13.00- 16.00 WIB. The agenda for teachers' training are teachers practice how to formulate indicators of thinking skills and ICT-Competence, teachers practice how to integrate the indicators of thinking skills and ICT-Competence in teaching and learning activities, and teachers practice how to use *Mentimeter* for supporting teaching and learning activity. There are twenty-one teachers who participated in both socialization and teacher training. It is located in the classroom of Garuda Junior High School.
4. **Monitoring and Evaluation**
   As the last process, monitoring and evaluation were conducted by giving the questionnaire for the participants to get feedback after doing the community service. Fifteen items of questions were distributed and should be completed by participants by using the Likert Scale to interpret the data. Besides, the facilitator also conduct the discussion continuously with the teachers to discuss about the process of incorporating thinking skills and ICT Competence in teaching and learning activities.

RESULT AND DISCUSSION

The finding of this community service showed that most teachers were still lack knowledge about 21st-century skills. Surprisingly, the result of the need analysis which was taken place, in the beginning, confirmed the previous research findings that many teachers were still absent comprehension of 21st-century skills and how to integrate and implement those skills in teaching and learning activities (Ratama et al., 2021; Shopia et al., 2022). As a result, it can influence the

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students' skills that are still low in processing and evaluating information and can't use ICT appropriately based on their needs. Certainly, thinking skills and ICT competence are needed to be comprehended by students and teachers in this information age. By conducting this community service, teachers obtained more knowledge about 21st-century skills through socialization programs and teacher training. In addition, this community service was conducted after research so that the research findings could be delivered in this activity.

21st-century skills namely thinking skills and ICT-Competences were delivered to the teachers as the participants in this community service. The research findings which were conducted by the author stated that some skills in the 21st century should be mastered by the present students and teachers. Those skills are described in the following table based on the result of library research in the previous;

Table 1. Overall Conceptual 21st-Century Skills

Thinking skills	Ways of Working	Tools for working	Living in the World
Creativity and Innovation	Communication	Information Literacy	Local and Global Citizenship
Critical Thinking	Collaboration and Teamwork	Research of sources, evidence biases,	Life and Career
Problem Solving		ICT Literacy	Personal and Social Responsibility
Decision Making			Cultural Awareness and Competence
Learning to Learn Metacognition			

Source: Assessment and Teaching of Twenty-First Century Skills project (ATC21S) (YEAR)

Thinking skills comprise six skills, as the accompanying table illustrates (Jos & Salle, 2014). However, this community service primarily focused on comprehending and practicing the three skills such as critical thinking, problem-solving, and decision-making. Furthermore, ICT-Competences as part of ICT Literacy is used as the tool for working in 21st-century skills. As mentioned in UNESCO that ICT-Competences also encourage students to practice thinking skills such as accessing, acquiring, managing, evaluating, communicating, etc (UNESCO ICT Competency Framework, 2011).

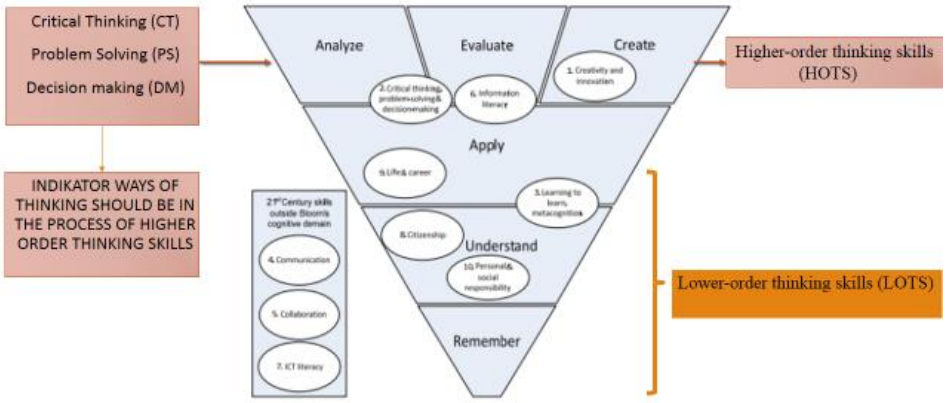

Figure 1. Interconnection between ATC21s Framework and Bloom's Taxonomy Revision

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The above figure represents the training materials given to teachers. It shows that ICT literacy is excluded from the Bloom's Taxonomy Revision (Wedlock & Growe, 2017). Meanwhile, the three levels of ICT competencies which are Knowledge Acquiring, Knowledge Deepening, and Knowledge Creation, according to UNESCO ICT Competency Framework for Teacher (ICT-CFT), support the students' critical thinking and problem-solving skills.

In problem-solving skills, the applied ICT-competences level is the knowledge creation and knowledge deepening. They cover analysis, evaluation, and creation activities. Related to the context of pedagogy, the Knowledge Deepening and Knowledge Creation involve some sophisticated model of teaching (UNESCO ICT Competency Framework, 2011), such as collaborative-problem solving and project-based learning where students are facilitated to explore and apply the subject in this challenging real-life situation.

On the other hand, critical thinking and decision-making abilities are classified as the Knowledge Creation level of ICT-competences according to the UNESCO ICT – Competency framework for teachers. Although the process of analyzing, evaluating, and creating are included in problem solving skills, critical thinking, and decision-making based on the theory stated by ATC21's framework and bloom Taxonomy revision, it differs from the understanding of the UNESCO ICT-Competency Framework for teachers.

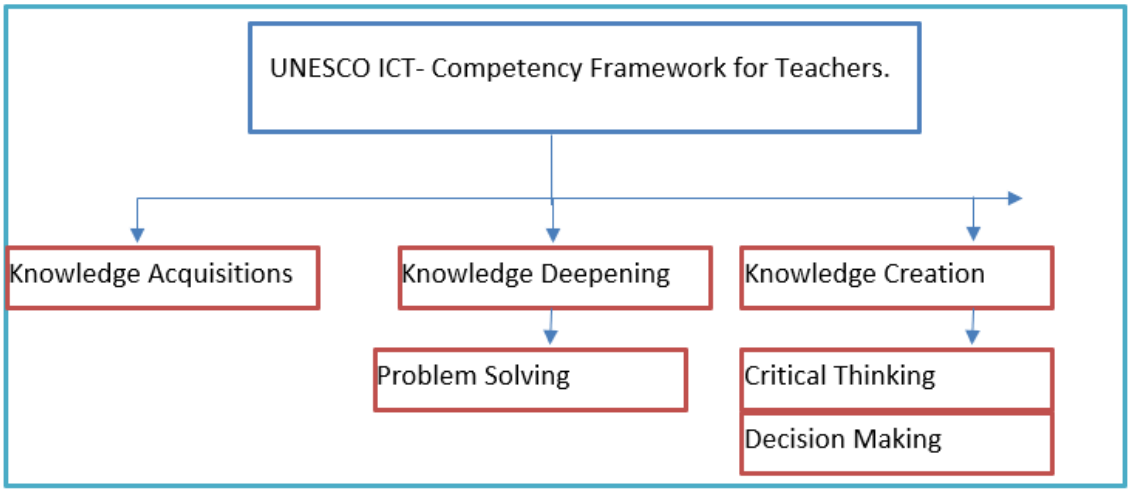

Figure 2. Interconnection between the Level of ICT-Competences and Thinking skills

The concept shown in Figure 2 was presented in community service. It supports teachers to enhance their professional competence to better equip their students to understand and apply 21st century skills specifically on ICT competence and Ways of thinking. The idea is supported by previous studies about the importance of these skills (Scott, 2015; Malik, 2018; Shopia et al., 2022; Kim et al., 2019).

Previous research has validated the importance of teachers' role in teaching students' ICT competencies and critical thinking skills. Teacher ought to integrate both 21st-century skills into their lesson (Denning et al., 2003). In addition, Mahini et al., (2012) claimed that teacher employ ICT in this information era by using two ways, such as: a) planning and delivering content to the learners, and d) effective communication between educators and students. When using either approach, educators must first have a thorough understanding of 21st-century skills. Teachers' dedication to assisting students in developing their skills becomes stronger during this type of training and students' motivation and engagement in the learning process are more evident. In the learning environment, the teachers' role is no longer as the source of knowledge but facilitators

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thus enhancing the quality of education (Kelly, M.G., Ed, 2002), and considering to students social and moral values improvement (Wrahatnolo & Munoto, 2018). The kind of education model calls for teachers' physical presence and direct communication to students. The teachers' role in technology-based education seems to be unavoidable due to its significant impact (Ezza, 2012).

In formulating the indicators of ways of thinking and ICT-competence, it can help teachers to integrate ways of thinking and ICT-Competence in teaching and learning activities. The following are the steps for integrating both skills in a teaching and learning activity: 1) acknowledge different types of thinking skills, including problem solving, critical thinking and decision making; 20 recognize the places of thinking skills in Higher order thinking skills according to the revised version of Bloom's taxonomy, including level of analysis, evaluation, and creation (see Figure 1). 3) create measurement of critical thinking, problem solving, and decision-making using terms from the bloom taxonomy's Higher order Thinking skills level. 4) include the indicators in the educational resources, like learning activities (Shopia & Iskandar, 2019; Sulistyaningrum, 2021; Shopia et al., 2022).

Afterwards, educators should develop ICT-competence indicators using operational words based on Bloom Taxonomy revision when incorporating ICT-Competences into learning resources in classroom activities and syllabuses. The level of ICT competences that will be used in the classroom, such as knowledge acquisition, knowledge deepening, and knowledge creation should be examined and decided by teachers prior the implementation (refer to figure 2). Once the understanding of the students' ICT competency level and indicators are set, teachers integrate the indicators into learning resources (Shopia & Iskandar, 2019; Shopia et al., 2022).

During the socialization program and training, teachers learned new information about 21st-century skills. The teachers accept that ICT competences and 21st-ways of thinking are necessary and highly significant for students in the current educational environment. Before performing the community service, 52% of teachers did not know or understand about 21st century skills, according to the result of questionnaire. Following the program of community service, all teachers (100%) firmly agree that both teachers and students need these skills. The outcomes of the program are described be the subsequent figure.

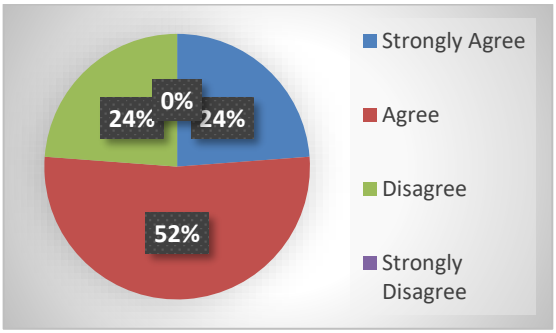

Figure 4. Teachers' Response to their Understanding of Thinking skills and ICT Competence

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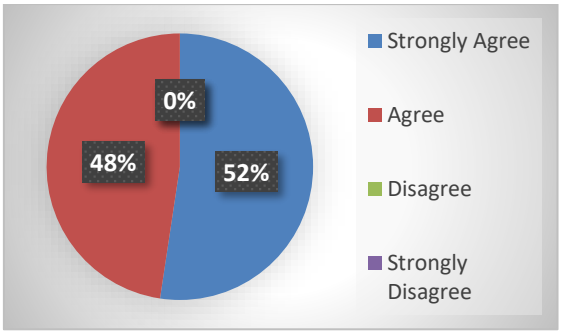

Figure 5. Teachers' Response after conducting community service about the Incorporation of ICT Competences and Thinking skills in Learning

The figure above shows disparities in teachers understanding of various ways of thinking and their ICT competency to support 21st-century teaching and their ICT competency to support 21st-century teaching and learning are evident. During the community service, 52% of the teachers strongly agreed and 48% agreed that using socialization and teacher training improves their understanding of ways of thinking and ICT competence. Initially 52% of teachers were unaware of these concepts. Then, as shown in figure 6, teachers' responses show that by participating in this community service, they can enhance their professional competence in 21st-century skills, particularly in ICT competence and ways of thinking, with 57% strongly agreeing and 43% agreeing.

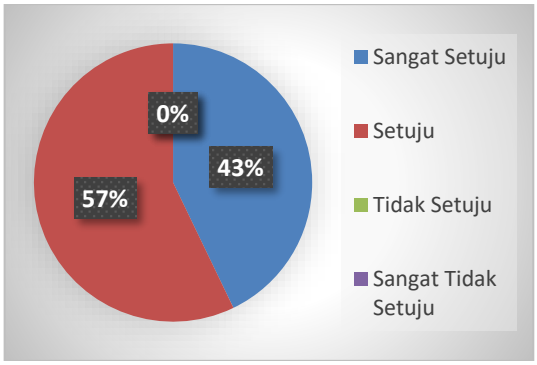

Figure 6. Teachers' Response that this community service can improve their professionalism

Figure 7. Teachers' socialization program

Figure 8. Teachers' Training Activity

In summary, the outcomes demonstrated the importance for educators to enhance their comprehension and expertise in accordance with the nowadays needs and demands. Educators have to develop and improve their professionalism. Teachers can apply the research findings in various ways, including reading related research findings and taking part in workshops, socialization, and training. Based on the questionnaire, it can be identified that the teachers who

participated in this community service project gain better professionalism and 21st-century skills they need. The results of the questionnaires that were distributed to teachers show that they responded favorably, which is expected and aid in the improvement of teachers' knowledge and comprehension.

CONCLUSION

To conclude, teachers should enhance their professional competence in continuously updating and improving their quality of teaching and learning relevant to the current needs and era. Through this community service, teachers acknowledge that professional enhancement can be executed by a variety of activities, including reading books, researching articles, taking part in workshops or teacher training, and performing community service. The outcomes of community service demonstrate how important it is for teachers to be ICT competent in order to facilitate learning in the classroom and develop their students' capacity for effectively absorbing, interpreting, and evaluating information. In actual classroom settings, teachers still struggle to integrate these two skills into the teaching and learning process. After completing this community service, the challenges faced by educators regarding both aspects are supported. However, a number of educators express dissatisfaction with school policies and procedures that do not allow for the best possible use of ICT. Teachers can, however, gain more insight into various modes of thought and the ICT-competencies they require through this community service. Even though the school's facilities are inadequate, this community service or *PKM* benefits teachers in broadening their understanding of ways of thinking and ICT competence to support learning activities.

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