TEACHER PROFESSIONAL DEVELOPMENT: PREPARING GRADUATE STUDENTS TO HAVE 4C SKILLS IN FACING INDUSTRIAL REVOLUTION 4.0

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ABSTRACT

There were several problems faced by the teachers in the community, including how to prepare the students to face the Industrial Revolution 4.0. Hence, the community activity aimed at informing the teachers to prepare their students with industrial revolution 4.0 skills including critical thinking, problem-solving, communication, collaboration, creativity, and innovation skills to face the industrial revolution 4.0. The research used community-based research to arrange the activity from the beginning until the end. Qualitative research was also used in the research design. There were 37 teachers as the participants in the research, and the data collection technique used was observation. There were three main findings of the research. First, it was found that the participants were engaged in the activity. Second, the teachers also discussed each other during the activity. Third, the teacher gave good feedback on the activity, including the materials and presenters. The findings indicated that the activity significantly enhanced the teacher engagement, collaboration, and feedback during the activity that emphasized the materials importance in enhancing professional development and equipping them to prepare their students in facing industrial revolution 4.0 era.

Keywords: 4C skills, teacher professional development, industrial revolution 4.0, community-based research

A. INTRODUCTION

The transition to the era of 4.0 in education is not an easy one. Technology and globalization have significantly altered the lives of individuals in this era, including the education sector. The rapid development is connected to quality and competitive human resources (Azmi et al., 2024; Rahmi et al., 2025). Therefore, it can be said that the education system in era 4.0 demands the learners to master good skills for facing all conditions. This era expects Indonesian people to face international trade and experience radical changes. This industrial revolution era always carries transformation and effects on current technologies (Yumelking & Sina, 2024). The students are expected to be ready to face era 4.0.

Students in this industry revolution era of 4.0 must be accommodated with creative thinking, critical thinking, innovation, and competence(Yumelking & Sina, 2024). The students are expected to have competences in analysis, evaluation, production of ideas, and collaboration with partner. The students should prepare themselves to live in the recent era. The students should have expertise and proficiency like critical thinking, problem solving, sommunication, collaboration, creativity, and innovation. The teaching and education implementation should focus on encouraging the students to have both hard and soft skills. Additionally, teachers are required to have higher-order thinking skills (HOTS) in this century. The development of technology brings big and significant changes to human's life. To face the future with possible competition in many aspects of life, students need to have high order thinking so when they become teachers, they can produce students with critical thinking, problem solving, creativity, innovation, communication and collaboration skills (Zhou et al., 2023) .

Therefore, Islam (2022) says that critical thinking skills let people use logic and reasoning to determine the strengths, weaknesses of substitute solutions, approaches to problems and conclusions.

Stanikzai (2023) argues that critical thinking is about analyzing, evaluating, and synthesizing information. Some research found that critical thinking improves the students' academic achievement, problem-solving abilities, and high-order cognitive skills. Once they can think critically, they can

engage and relate to each other. Critical thinking skills help students to improve and advance themselves in the process of analytical ability, higher level of concentration, and well-guided thought.

As explained by Daulay et al. (2021), communication and collaboration are soft skills that are also necessary to be mastered by the students. Communication skills are important for them. They can exchange information with each other and use communication competencies like being open and friendly, two-way communication, focusing on social and cultural facets of communication, and others. Then, cooperation skills are needed because the students might work with people from different ages, genders, races, religions, or political views. Additionally, creativity is about the innovation of ideas, thinking beyond others' thoughts, and having solutions for uncommon problems (Stanikzai, 2023). Creativity and innovation indeed urgently need to be mastered by students to face the Industrial Revolution 4.0 (Azmi et al., 2024).

The teachers are challenged to prepare the generations that are ready to face Era 4.0 (Azmi et al., 2024). The teachers should make some innovations in the teaching process. Teachers should be creative and have skills that help them face challenges in the current century (Hasni et al., 2022). The learning process at school should include all the necessary competences in this era. The teachers need to be able to prepare the students to have skills that include understanding technology and digital literacy.

Based on the problems above, there was a need to hold an activity to inform the teacher about the 4C skills and how the skills would be useful for the students after they graduated, especially on how to prepare their students for the Industrial Revolution 4.0 including developing critical thinking, problem-solving, communication, creativity, and innovation skills. Therefore, the community activity was held. The community activity was not only one-way communication from the speaker to the teachers, but also between the teachers themselves. After that, the community activity was reported in this study. There were several previous research regarding the 4C skills and the teachers' development. One of them was the research of Sunardi and Doringin (2020). They examined the impact of 4Cs

models on teachers' performance in the 21st century. They indicated that the 4Cs model inspires and enhances teachers' technology competence in classroom activities. Additionally, it highlights the importance of communication, creativity, collaboration, and critical thinking.

The research aimed to provide a comprehensive understanding of the implementation of a community activity designed for teachers. The primary objective of the research is to describe in detail how the community activity carried out in practice which included the extent of teacher involvement, and the dynamics of interactions that take place during the activity. The impact considered is not limited to the improvement of knowledge or skills but also encompasses changes in attitudes, motivation, sense of collegiality, and professional identity that may arise as a result of participation in the community. The research question was How does the teacher community activity take place?

B. IMPLEMENTATION AND METHODS

This research was conducted qualitatively through community-based research. This type of research involves partners to figure out the community's strengths (Busetto et al., 2020). Moreover, community-based research uses a collaborative approach to find the community's problems and needs and provide solutions in an attempt to enhance social change (Susilawati et al., 2016).

The data were collected through observation. This technique was applied since this study observed the teachers' skills in producing and improving students' critical thinking, problem-solving, communication, collaboration, creativity, and innovation skills for the Industrial Revolution 4.0. Observation is a valuable method for watching a phenomenon and drawing conclusions about the situation in a particular setting (Busetto et al., 2020). It is a vital technique for gathering infromation and comprehending the phenomena in the natural setting without intervening or changing the situation being oberved (Barrios et al., 2022). In this regard, observation was conducted by directly observing the field and taking notes to obtain the data needed in this research. As stated by Campos and Lule in Barrios (2022), there at least four advantanges of observation as data collection technique. First, it

give precise and accuracte behavioral information. Second, this technique is flexible as it can work in a variety of setting. Third, the active participation from the subject being studied is not required. Fourth, it is a cost-effective choice because it is easy to implement.

The participants of this community-based service were 37 teachers located in West Java, Jakarta, and Banten. The teachers were involved because they were interested in this research, and the context directly related to them as teachers (Shah et al., 2023). The research procedure consisted of four steps: establishing fundamental ideas and theory of the study, planning the study, gathering and analyzing the information from the study, and taking further action based on the findings (Susilawati et al., 2016).

First, establishing fundamental ideas and theory of the study involved organizing the teachers as a steering team and dividing tasks between stakeholders and the team, identifying assumptions on the research, refining the context, and identifying the objective of the research. Second, planning the study was related to determining the research questions, developing the research methods, and planning the data analysis. Third, gathering and analyzing the information refers to collecting data and information as well as analyzing and interpreting data, information, and findings. Finally, taking further action based on the findings focused on sharing information about the findings and taking action and follow-up plan based on the findings.

C. RESULTS AND DISCUSSION

The community service aimed to inform the teachers to prepare their students to have the skills of critical thinking, problem-solving, communication, collaboration, creativity, and innovation in order to face the Industrial Revolution 4.0. Community-based research (CBR) has enabled researchers to take a collaborative approach that actively involves the researchers and the teachers' community. The community service activity has produced information that is uplifting and applicable and empowers the community regarding teachers' readiness to accompany their students in facing the 4.0 era. There were three findings of the research: the teachers' engagement, group discussions, and feedback (See

Figure 1.). Each finding provides a different but complementary contribution to understanding teachers' readiness to accompany their students.

First, based on the results of the observation data, it appears that the teachers ware involved and engaged during the activity. Observation data showed that from the 37 of the teachers, it was found that most teachers (28 out of 37) actively engaged that they joined the activity on time and listened to the material well. The teachers seemed enthusiastic in listening to the material presented. It meant that they were involved, and it became an indicator of the success of the community service activity. Based on Ochieng et al. (2021), engagement is important in a community activity to see how much the participants, and in this research were the teachers, comprehend the materials delivered (See Figure 2.). Besides, the materials presented were also related to today's technology development as era 4.0 is coming in which became the new information to them. Based on the material delivered, the education advancement system in the 4.0 era forced the students to possess proficient skills across all domains so that the teachers had to provide teaching and learning activity which support the learning outcome. The era demands that the Indonesian populace confront international trade and undergo significant transformations. It is consistent with the assertion made by Sunardi and Doringin (2020) that teachers must be prepared to impart the necessary skills to students in the future. Teachers who participate in this program will receive mapping, training, exercises, and recommendations as part of the professional development learning process (Figure 2).
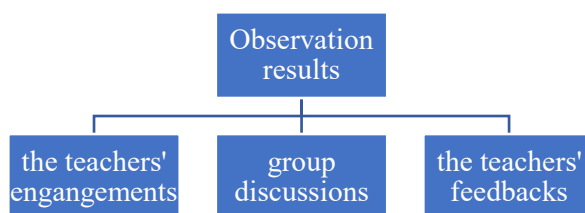

Figure 1. Research findings.

Moreover, the research reveals that when teachers are genuinely engaged in the learning process, they are more likely to engage in reflection, consciously assessing the educational experience and

making necessary adjustments to equip students for the 4.0 era. The most important thing is to change how education and teaching are done so that students can learn both hard and soft skills (Azmi et al., 2024).

The second finding was a group discussion between teachers. Based on the results of the observation data, it was seen that teachers were discussing with each other during the event. The teachers were divided into 5 groups and they exchanged ideas and experiences, expressed opinions, and solved problems together in their group discussions. According to Dewi and Pratama (2019), with group discussions, teachers could think more deeply because they not only receive information from the presenters but also understand, interpret, and prepare themselves when the teaching and learning process takes place later in the class (Ningsi et al., 2021).

The last findings of the research was the teachers' feedback on community service activities. As the activities and the materials aimed at equipping the teachers to provide Era 4.0 skills fot their students, based on the results of observations, the teacher provided good feedback on the event, including the material and the presenters. It was found that all teachers who were event participants survived until the end of the event. Out of the 37 teachers, the majority expressed that the community activities were engaging and directly relevant to their teaching practice. They highlighted that the materils and discussion session made the training practical and applicable. Apart from that, some teachers also ask questions regarding the material being explained. All questions were answered well by the presenters.

Figure 2. Material presented.

As the teachers actively engaged in activities not only demonstrated enthusiasm for the material (Figure 2) but also naturally encouraged further interaction among themselves. This engagement created a collaborative atmosphere, where teachers compelled to share their experiences, perspectives, and learning strategies. Discussions between teachers then developed into a space for shared reflection, becoming more than just an exchange of opinions but also a collective learning process. From these interactions, various constructive feedback emerged, both regarding the content of the material, the delivery method, and the relevance of the activities to teaching practice. In other words, the teachers' initial involvement triggered a professional dialogue that completed in the generation of useful input for improving future activities, particularly in preparing students for the skills necessary for the Industrial Revolution 4.0.

Finally, the activity successfully enhanced teacher engagement, collaboration, and reflection, and has the potential to serve as an effective model for teacher professional development programs in the context of the industrial revolution 4.0. Then, the community service activity has the potential to solve the problem of preparing teachers to guide their students in the development of several essential skills. It allows the students to graduate with the abilities of critical thinking, problem solving, communication, collaboration, creativity, and innovation, which will be necessary for them to face the challenges of the fourth industrial revolution.

D. CONCLUSION

Since there is a need to prepare students for the Industrial Revolution 4.0, this study was conducted to help teachers develop students' critical thinking, problem-solving, communication, collaboration, creativity, and innovation skills. Based on the findings, it can be concluded that the teachers were highly motivated and actively participated during the process of delivering materials. It indicates that community-based research is efficacious in improving their understanding of the materials; therefore, it will enable them to make improvements and adjustments in the teaching process in an attempt to prepare students for the 4.0 era.

However, this study has limitation and recommendation for further research. This study only relied on single data collection technique. Providing other data collection techniques, such as interviews, survey, and document analysis could have given deeper understanding on teachers' perception about the implementation of community activity related to 4C skills. Another limitation is the lack of students' perspective about the benefits of teaches's awareness of 4C skills. The reaseach only focused on teachers' experiences. It is also important to gain understanding about how the students take benefits from their teachers' improved awareness of 4C skills.

Moreover, for further research, it is crucial to conduct longitudinal studies to comprehend the implementation of 4C skills in the teachers' classroom and whether it improves students' competencies by combining observation with interview, survey, and document analysis. Finally, it is expected that the students will be ready to face the 4.0 era after acquiring those kinds of skills.

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