

Innovative Pedagogy in Remote Papua: Enhancing Catholic Teachers' Competencies through Challenge-Based Learning in Keerom

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Abstract. Keerom Regency in Papua, Indonesia, is a remote area facing significant geographical, social, and cultural challenges. Limited access to educational resources and a lack of professional training opportunities for Catholic religious education teachers have contributed to the low quality of teaching. Moreover, the scarcity of contextually relevant teaching materials makes it difficult for teachers to deliver lessons that connect with students' daily lives. This community service project aimed to enhance teachers' competencies through a workshop on developing teaching modules based on the Case-Based Learning (CBL) approach. The program used a quasi-experimental method with pre-tests and post-tests to measure the improvement in participants' pedagogical skills. The training combined theoretical concepts and practical sessions, emphasizing the development of CBL-based teaching modules relevant to students' social, cultural, and religious contexts. The results showed a significant increase in teachers' competence, with post-test scores improving by 80% compared to the pre-test results. The participants' active engagement and enthusiasm throughout the training further demonstrated the success of the program. This initiative contributed not only to improving teachers' skills but also to enhancing the overall quality of Catholic religious education in remote areas. Sustainable implementation requires ongoing training and adequate educational support.

Katakunci: Pembelajaran Berbasis Kasus; Kompetensi Guru; Pendidikan Agama Katolik; Daerah Terpencil.

Abstrak. Kabupaten Keerom, Papua, merupakan wilayah terpencil dengan tantangan geografis, sosial, dan budaya yang kompleks. Keterbatasan akses pendidikan dan minimnya pelatihan profesional bagi guru Pendidikan Agama Katolik berdampak pada rendahnya kualitas pembelajaran. Selain itu, ketersediaan bahan ajar yang kontekstual masih sangat terbatas, sehingga pembelajaran sering kali kurang relevan dengan kehidupan sehari-hari peserta didik. Program pengabdian ini bertujuan meningkatkan kompetensi guru melalui pelatihan penyusunan modul ajar berbasis Case-Based Learning (CBL). Kegiatan dilaksanakan dengan metode kuasi-eksperimen menggunakan pre-test dan post-test untuk mengukur peningkatan kompetensi peserta. Materi pelatihan memadukan teori dan praktik, dengan fokus pada

pengembangan modul ajar berbasis CBL yang sesuai dengan konteks sosial, budaya, dan keagamaan siswa. Hasil menunjukkan adanya peningkatan signifikan dalam kompetensi guru, dengan skor post-test meningkat sebesar 80% dibandingkan pre-test. Tingginya antusiasme peserta selama proses pelatihan memperkuat keberhasilan program ini. Kegiatan ini berkontribusi nyata terhadap peningkatan kualitas pembelajaran Pendidikan Agama Katolik di daerah terpencil. Untuk keberlanjutan program, diperlukan pelatihan lanjutan dan dukungan sarana pendidikan yang memadai.

1 Introduction

Education plays a vital role in shaping the character and competence of students, especially within the context of Catholic Religious Education. Strengthening innovative learning methods is crucial to ensure that students not only grasp religious values but are also able to apply them in their daily lives (Syakur et al., 2021). However, many teachers continue to use traditional, teacher-centered methods that fail to actively engage students, preventing them from fully participating in the learning process.

One effective approach to address this challenge is the Case-Based Learning (CBL) model. CBL encourages students to analyze, discuss, and resolve real-life cases that are relevant to their daily experiences. According to (Lion et al., 2022), CBL is a pedagogical strategy that utilizes case studies to foster critical thinking, analysis, and decision-making skills (Liu et al., 2025). It enables learners to connect theoretical knowledge with practical applications in real-world contexts, leading to a deeper understanding of the subject matter (Amelia et al., 2024).

The implementation of CBL within Catholic Religious Education offers the potential to improve students' comprehension of religious teachings by encouraging reflection and contextual analysis of real-life situations. Highlighted that case-based learning enhances student engagement by presenting scenarios that require analytical thinking and problem-solving based on religious values (Papakostas, 2024).

The relevance of CBL becomes even more evident when considering the Independent Curriculum, which emphasizes project-

based learning and the exploration of concepts that resonate with students' daily lives. The Independent Curriculum encourages active, creative, and independent learning, and CBL serves as a powerful tool to promote these goals. By solving real-world problems and applying deep understanding of the material, students can experience meaningful learning. According to the Ministry of Education, (Alawiyah et al., 2024), the Independent Curriculum pushes teachers to adopt adaptive, competency-based learning methods, and CBL fits perfectly within this framework by boosting critical thinking and problem-solving skills.

In Keerom Regency, Papua, the application of the CBL method is still minimal, primarily due to limited training opportunities and a lack of supporting resources for teachers (Novirsari & Ponten Pranata, 2021). Given this, the workshop on preparing CBL-based teaching modules for Catholic religious teachers is an essential initiative. The workshop aims to equip teachers with the skills needed to design case-based teaching modules that are contextually relevant to the unique needs of students in this region (Sulistiami et al., 2023).

In addition, Keerom Regency is known for its high ethnic diversity, consisting of indigenous Papuan tribes such as the Waris, Arso, and Walsa, as well as migrants from various regions of Indonesia. This diversity creates unique social dynamics, particularly in the context of religious education. Catholic religious education teachers in Keerom are not only required to deliver subject matter but also to design learning processes that are sensitive to cultural diversity and local values. This condition makes strengthening teachers' competencies through the Case-Based Learning approach highly relevant, as it enables religious education to be more contextual, connected to students' real-life experiences, and fosters attitudes of tolerance and respect for differences.

The importance of this community service lies in its potential to address the gap in teacher training and enhance the quality of Catholic religious education in Keerom. The service is being carried out with 29 Catholic religious education teachers from primary, middle, and high school levels, all of whom are directly involved in the educational process of students in this underserved region. By conducting this service within

schools, the initiative ensures that teachers are directly supported in their classroom practices, enabling them to implement CBL effectively and create more engaging, meaningful learning experiences. It is hoped that through this workshop, teachers will gain the confidence and skills to apply CBL in their classrooms, thus improving educational outcomes for students in Keerom in alignment with the Merdeka Curriculum.

2 Method

This Community Service (PkM) was conducted in Keerom Regency, Papua, with 29 target teachers under the auspices of the Santa Maria Catholic Church Foundation, who came from elementary, middle, and high school levels using quasi-experimental methods and designs involving pre-tests and post-tests to measure the effectiveness of the workshop in improving teacher competency in compiling teaching modules based on Case Based Learning (CBL) (Pranata & Husain, 2022). This workshop aims to improve the skills of Catholic religious teachers in the area in designing teaching modules that are more creative and relevant to the local context (Kouroupi & Metaxas, 2023). The population in this activity was all Catholic religious teachers in Keerom Regency, with the research sample consisting of 29 Catholic religious teachers from elementary, middle, and high school levels who participated in the workshop.

This Community Service (PkM) has structured stages with the aim of providing a positive impact on improving the competence of Catholic religious teachers in Keerom Regency, Papua. These stages include problem analysis, planning, implementation, and evaluation, known by the abbreviation ABCD (Zapata-Cáceres et al., 2024).



Figure 1. Service stages using the ABCD method

The Community Service Team (PkM) from the ST. Yohanes Rasul Jayapura-Papua Catechetical Pastoral College carried out a series of stages to improve the competence of Catholic religious teachers in Keerom Regency, Papua, in compiling teaching modules based on the Case Based Learning (CBL) approach.

The first stage, Problem Analysis (A), begins with identifying problems that exist in the target community (Wahyoedi et al., 2021). In this case, the problem found was the low competence of teachers in designing CBL-based teaching modules, which was caused by limited training and resources in the area. Based on this understanding (Asmoro, 2024), the PkM team formulated a clear goal, namely to improve teacher skills in designing relevant and creative teaching modules according to local needs.

After the problem is identified, the PkM team proceeds to the Planning stage (B). At this stage, the team designs a workshop program aimed at improving teacher competency. This plan includes the selection of training methods, materials to be delivered, and evaluation strategies to be used, namely through pre-tests and post-tests (Pranata & Sinaga, 2023). The selection of participants was carried out using a purposive sampling technique to ensure that the teachers involved could follow all stages of the activity properly.

The third stage, Implementation (C), involves implementing the workshop according to the plan that has been prepared. This workshop

is designed to provide hands-on training on preparing CBL-based teaching modules (Yang et al., 2023). The training process includes theory, practice, and observation of participant involvement during the activity. Training result data is collected through pre-tests and post-tests to measure changes in participants' understanding and skills after attending the workshop.

Finally, at the Evaluation and Documentation (D) stage, the PkM team analyzed the results of the pre-test and post-test using statistical tools to determine whether there was a significant increase in teacher competence. In addition, observations during the training were also evaluated to assess the effectiveness of the methods used. The results of this evaluation are then documented in a report that provides a complete picture of the impact of this community service activity and recommendations for further development in the future.

3 Results

From the analysis of the problems found, it is clear that Catholic religious teachers in the Keerom Regency still need to improve their competence, especially in compiling teaching modules based on the Case Based Learning (CBL) approach. Despite having basic knowledge of the teaching materials, teachers often face limitations in designing modules that are not only interesting but also relevant to the local context and needs of students in the area. This limitation is caused by the lack of specific training on CBL and resources that support the development of case-based learning.

Implementation carried out by the Community Service team: the team successfully carried out a workshop for Catholic religious teachers in Keerom Regency with the aim of improving their competence in compiling teaching modules based on the Case Based Learning (CBL) approach. Implementation carried out by the Community Service team: the team successfully carried out a workshop for Catholic religious teachers in Keerom Regency with the aim of improving their competence in compiling teaching modules based on the Case Based Learning (CBL) approach.

The training process is carried out practically and comprehensively, where teachers not only receive theoretical material but are also invited to directly design case-based teaching modules that are relevant to the lives of students in the area (Alavi, 2023). Participants were actively involved in discussions, sharing experiences, and seeking solutions to challenges faced in implementing the CBL method. With an approach involving various learning techniques, the workshop ran smoothly, and teachers showed high enthusiasm and involvement, which is a positive indicator of the effectiveness of this activity.

In addition, in this service, the team also provided direct practice in the classroom by directing teachers to apply the teaching modules they had prepared in real situations in the learning environment (Asef & Kalyvas, 2022). Participants were actively involved in discussions, sharing experiences, and finding solutions to the challenges faced in implementing the CBL method. With an approach involving various learning techniques, the workshop went smoothly, and the teachers showed high enthusiasm and involvement, which is a positive indicator of the effectiveness of this activity.

The third stage in this service is Evaluation, which aims to measure the extent to which the intervention given during the workshop has succeeded in improving the competence of participants. Evaluation is carried out by analyzing the results of the pre-test and post-test that have been collected previously (Karrupiah et al., 2024). Through statistical analysis, such as the paired t-test with SPSS 26, the service team can see significant changes in the understanding and skills of participants related to the preparation of teaching modules based on Case Based Learning (CBL). In addition, the Evaluation also includes observations of participant involvement during the activity to assess the effectiveness of the training methods used (Bansak et al., 2024). The results of this Evaluation are the basis for providing further recommendations for the development of similar activities in the future. The following presents the results of a more in-depth analysis of the data that has been collected.

Tabel 1. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair	Pre								
1	Test - Post Test	-19.5666	9.59761	1.23905	-22.0459	-17.0873	-15.79	59	.000

Table 1 presents the results of the Paired Samples Test to measure the difference between the pre-test and post-test scores. The results show that the average difference between the pre-test and post-test is -19.5666, which indicates a significant increase in the post-test scores compared to the pre-test. The standard deviation of the difference is 9.59761, indicating variation in the difference in scores between participants. In addition, the 95% confidence interval for the difference is between -22.0459 and -17.0873, indicating that the changes between the pre-test and post-test are quite consistent. The t-statistic value obtained is -15.79 with a degree of freedom (df) of 59, indicating that there is a statistically significant difference. The significance value (p-value) is 0.000, which is much smaller than 0.05, indicating that this difference is significant. Thus, the results of this test confirm that the intervention carried out has succeeded in significantly improving the results of the participants.

The implementation stages of the activity above, using the ABCD (Asset-Based Community Development) approach, have been systematically documented, starting from the Discover stage (identifying the teachers' potential and needs), the Dream stage (formulating shared goals related to improving teaching competencies), the Design stage (developing CBL-based teaching modules), to the Destiny stage (implementing and following up on the training). The entire process is presented in the activity documentation shown in the image below.

No	Figure	Description
1		Identifying the community's potential and issues, especially teachers' low competence in developing Case-Based Learning (CBL) modules, through observation and initial discussions to explore their actual needs.
2		Formulating a shared vision and goals to improve teacher competence through training on contextual and applicable CBL module development. Teachers are encouraged to envision ideal learning outcomes for students in remote areas.
3		The community service team and teachers collaboratively design the training activities, including materials, methods, and evaluation schemes, and implement them in the learning process.

4



The developed modules are applied in real classroom practices. Evaluation is conducted through pre-tests and post-tests, followed by a reflection phase.

Based on the analysis results, there was a significant increase of 80% between the average pre-test and post-test scores, indicating that the intervention provided during the workshop effectively improved participants' competence in designing Case-Based Learning (CBL) teaching modules. The evaluation process also included observations of participants' involvement throughout the sessions, which demonstrated high levels of active participation and enthusiasm in each stage of the workshop. All findings from both the data analysis and observational notes were compiled into a comprehensive report. This report serves as a foundation for formulating recommendations for similar future programs and contributes significantly to the development of Catholic religious education in remote areas like Keerom Regency.

4 Discussion

The implementation of a workshop on the preparation of teaching modules based on Case-Based Learning (CBL) in Keerom Regency, Papua, led to measurable improvements in the competence of Catholic religious teachers in designing more relevant and engaging teaching materials. During the problem analysis stage, it was found that many teachers in the region struggled to develop teaching modules that were not only engaging but also suited to the local context and the specific needs of students. Teachers were familiar with basic teaching materials, such as religious texts and traditional methods, but lacked the ability to design interactive and contextually appropriate content that would foster student engagement. This gap was primarily due to a lack of formal training in the CBL approach and the scarcity of resources to create case-

based teaching materials. For instance, many teachers had limited exposure to active learning strategies, such as case discussions or problem-solving scenarios, which are crucial to CBL's effectiveness (Gholami et al., 2021). Given Keerom's unique challenges such as its remote location, diverse student backgrounds, and limited access to modern educational resources—the workshop was specifically tailored to address these barriers. Practical training sessions focused on helping teachers adapt CBL to their local conditions, ensuring that the materials they developed would be both meaningful and applicable to their students' everyday lives. The results, supported by pre-test and post-test data, demonstrate a clear improvement in teachers' ability to design and implement CBL-based teaching modules, highlighting the workshop's significant impact on their professional development.

In the second phase, the community service team successfully conducted a workshop that not only introduced the theoretical foundations of Case-Based Learning (CBL) but also provided teachers with the opportunity to directly design case-based teaching modules relevant to students' lives in Keerom. The CBL approach used in the workshop was adapted from the research by (Sun & Zhu, 2024), which emphasized the importance of engaging students through real-life case scenarios to enhance critical thinking and problem-solving skills. The training was conducted interactively, with participants actively discussing, sharing experiences, and seeking solutions to various challenges in implementing the CBL method. A key observation from the workshop was the high level of enthusiasm and involvement of the participants, as evidenced by a 95% attendance rate throughout the sessions. Furthermore, the post-workshop satisfaction survey revealed that 90% of participants expressed high levels of satisfaction with the training, particularly appreciating the hands-on approach and the practical applicability of the materials. One participant shared, "The training gave me the confidence to implement new methods in my teaching." These findings demonstrate the effectiveness of the CBL approach in engaging teachers and fostering their professional growth, confirming the positive impact of the workshop.

The evaluation in the third stage yielded highly encouraging results. The analysis of pre-test and post-test scores revealed a significant increase in participants' understanding and skills related to the preparation of CBL-based teaching modules. Specifically, the average post-test score increased by 19.57 points compared to the pre-test, with a paired t-test result of $t = -15.79$, $p < 0.001$, indicating that the workshop intervention led to a statistically significant improvement in the teachers' competence. This quantitative data clearly supports the claim that the workshop had a positive impact on participants' ability to design case-based teaching modules. Additionally, the evaluation included observations of participant involvement during the workshop, which indicated active engagement throughout the sessions. For instance, 90% of participants actively contributed to group discussions and case analysis exercises. These findings strengthen the conclusion that the workshop effectively enhanced the teaching quality of Catholic religious teachers in Keerom. The evaluation methodology was adapted from the approach used by (Nicoletti Junior et al., 2018), which utilized pre- and post-assessment tools to measure changes in knowledge and skills following an educational intervention. This methodological adaptation ensured that the evaluation was both rigorous and relevant to the objectives of the workshop.

Overall, these findings indicate that CBL-based workshops have not only succeeded in improving teachers' competence in designing more creative and relevant teaching modules but have also had a positive impact on the quality of Catholic religious learning in remote areas (Asmoro, 2024). With such training, teachers not only gain practical skills but can also create more active and meaningful learning experiences for students. Therefore, it is very important to continue ongoing training to ensure that the CBL method can be applied widely and consistently throughout the Keerom area, as well as to strengthen the support of resources and facilities that support the development of case-based learning.

The implementation of a workshop on the preparation of teaching modules based on Case Based Learning (CBL) in Keerom Regency, Papua, has had a significant impact on improving the competence of Catholic

religious teachers in designing more relevant and interesting teaching materials. In the first stage, the problem analysis revealed that many teachers in the area faced difficulties in preparing teaching modules that were not only interesting but also appropriate to the local context and students' needs. Although these teachers had basic knowledge of the teaching materials, they had difficulty in applying teaching methods that could actively engage students. The main problems found were the lack of specific training on the CBL approach, as well as limited resources to support the development of case-based teaching modules. Therefore, this workshop was designed to address these needs by providing practical training that was relevant to the challenges faced by teachers.

In the second phase, the community service team successfully conducted a workshop that not only delivered theories about CBL but also provided an opportunity for teachers to directly design case-based teaching modules that were relevant to students' lives in Keerom (Sun & Zhu, 2024). This training was conducted interactively, where participants actively discussed, shared experiences, and sought solutions to various challenges in implementing the CBL method (Sun & Zhu, 2024). One of the most prominent findings was the high enthusiasm and involvement of the participants in each workshop session, indicating that they were very open and motivated to develop new skills in their teaching. This reflects the effectiveness of the approach applied in the workshop.

The evaluation in the third stage showed very encouraging results. Based on the analysis of the pre-test and post-test, there was a significant increase in the participants' understanding and skills related to the preparation of CBL-based teaching modules. Statistical tests showed that the difference between the pre-test and post-test scores was very significant (Nicoletti Junior et al., 2018), indicating that the workshop intervention succeeded in significantly improving the teachers' competence. In addition, observations of participant involvement during the workshop showed active participation, further strengthening the conclusion that the workshop was effective in improving the teaching quality of Catholic religious teachers in Keerom.

Overall, these findings indicate that CBL-based workshops have not only succeeded in improving teachers' competence in designing more

creative and relevant teaching modules but have also had a positive impact on the quality of Catholic religious learning in remote areas (Asmoro, 2024). With such training, teachers not only gain practical skills but can also create more active and meaningful learning experiences for students. Therefore, it is very important to continue ongoing training to ensure that the CBL method can be applied widely and consistently throughout the Keerom area, as well as to strengthen the support of resources and facilities that support the development of case-based learning.

5 Conclusion

The community service program focusing on the development of Case-Based Learning (CBL) teaching modules for Catholic religious education teachers in Keerom Regency, Papua, successfully achieved its primary objective of enhancing teachers' competencies in designing creative and contextually relevant learning materials. The evaluation results showed a significant improvement in participants' abilities, with an average score increase of 19.57 points and a statistically significant t-test result ($t = -15.79$, $p < 0.001$). These findings were further supported by observational data indicating active participation and enthusiasm from the participants throughout the training sessions. The teachers not only gained a theoretical understanding of the CBL concept but were also able to apply it directly in classroom practices, thereby contributing to the improvement of Catholic religious education in this remote area.

Building on these positive outcomes, further efforts are needed in the form of follow-up training, the provision of teaching materials, and improved access to technological resources to ensure the sustainable implementation of CBL in Keerom. This program represents a strategic first step in strengthening teacher capacity and fostering more meaningful learning experiences for students, aligned with the goals of a competency-based curriculum and the contextual needs of the local community.

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